U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

DRAFT

Oregon State Office

May 1982

Riley Grazing Management

Environmental Impact Statement

IN REPLY REFER TO:

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

OREGON STATE OFFICE
P.O. Box 2965 (825 NE Multnomah Street)
Portland, Oregon 97208

Enclosed for your review and comment is the Riley Grazing Management Draft Environmental Impact Statement (EIS). The statement analyzes the impacts which would result from the proposed livestock management program and three alternatives. The purpose of the statement is to disclose the probable environmental impacts for consideration along with economic and technical information in the decisionmaking process.

Some of the proposed range improvements arrayed in this EIS may be dropped from consideration after completion of benefit cost analysis. After completion of the decision process the actual level of range improvements will also be limited by availability of funds.

One EIS, the Harney EIS, was originally scheduled to analyze the grazing management on the Riley Planning Unit and the Andrews Resource Area. Under a revised schedule, a separate EIS is being prepared for each area. The Riley EIS covers the Riley Planning Unit. The Andrews EIS, the draft of which will be distributed this fall, will cover the Andrews Resource Area.

Comments concerning the adequacy of this statement will be considered in the preparation of the final environmental impact statement. The comment period will end August 3, 1982. An informal meeting to answer questions on the draft EIS will be held at 7:30 p.m., July 14, 1982, in Burns, Oregon, in the Club Room of the Harney County Museum. Bureau of Land Management personnel will be available to answer questions regarding the draft EIS analysis.

The draft EIS may be incorporated into the final EIS by reference only. The final EIS then would consist of public comments and responses and any needed changes of the draft. Therefore, please retain this draft EIS for use with the final.

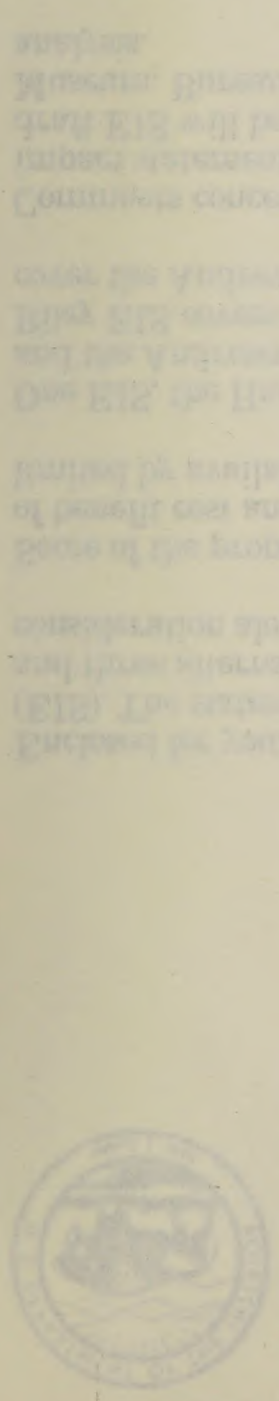
Comments received after the close of the comment period will be considered in the decision process, even though they may be too late to be specifically addressed in the final environmental impact statement. Your comments on the draft EIS should be sent to:

Oregon State Director (935)
Bureau of Land Management
P.O. Box 2965
Portland, Oregon 97208

Sincerely yours,

William D. Leavell

State Director



Draft

Environmental Impact Statement

Riley Grazing Management Program

Prepared by
Bureau of Land Management
Department of the Interior
1982

William D. Seavill

State Director, Oregon State Office

RILEY PROPOSED GRAZING MANAGEMENT

Draft (x) Final ( ) Environmental Impact Statement
Department of the Interior, Bureau of Land Management

1. **Type of Action:** Administrative (x) Legislative ( )

2. **Abstract:** The Bureau of Land Management proposes to implement livestock grazing management on 1,081,140 acres (55 allotments) of public land in central Oregon. Unalloted status would continue on 11,867 acres. Implementation of the proposed action includes allocation of vegetation to livestock, wild horses, wildlife and nonconsumptive uses; establishment of grazing systems; and construction of range improvements. Forage condition would improve and forage production would increase.

Initially, there would be a 27 percent increase in allocation to livestock from the 1980 actual use of 57,975 AUMs. No change in the amount of water runoff would occur, however, sediment yield would decrease. Big game populations are expected to increase slightly. Increased fish production can be expected on Hay Creek and Wickiup Creeks with production remaining the same in all other streams and reservoirs. Waterfowl production would increase moderately. The numbers of upland game birds are not expected to change. Two operators would lose forage exceeding 10 percent of their annual requirements under all alternatives except Alternative 3. Under Alternative 3, losses exceeding 50 percent of current requirements would be experienced by 8 operators for a period of one or more months of the year.

3. Alternatives analyzed:

a. No Action
b. Emphasize Livestock Grazing
c. Emphasize Non-Livestock Grazing Values.

4. Draft statement made available to EPA and the public early June 1982. The comment period will be 60 days, ending August 3, 1982.

5. **For further information contact:**

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Oregon State Office
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Portland, Oregon 97208
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SUMMARY

This environmental impact statement (EIS) describes and analyzes the environmental impacts of implementing a livestock grazing management program in the Riley EIS area of the Burns District in eastern Oregon. The proposed action, developed through the Bureau planning system using public input, is the preferred alternative. Three other alternatives are also described and analyzed.

The proposed action consists of range improvements, vegetation allocation and implementation of grazing management of 55 allotments covering 1,081,140 acres of public land and continued unalloted status (no authorized livestock grazing) on 11,867 acres.

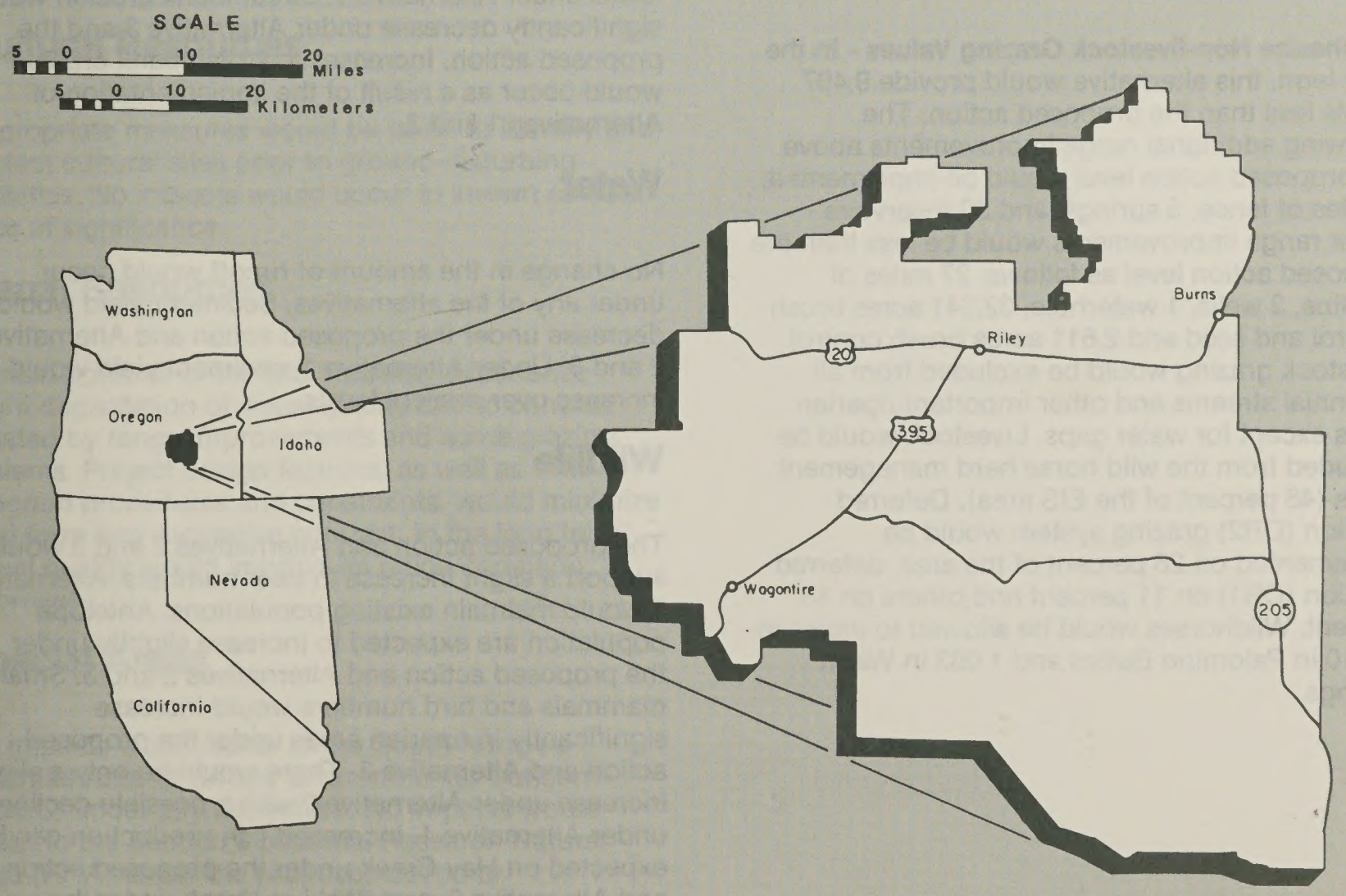
The purpose of the proposed action is to implement planning decisions needed for management, protection and enhancement of the rangeland resources. The proposal would cover a 25-year period; 10 years for implementation and 15 additional years to achieve objectives.

Under the proposed action, the existing forage production of 78,865 AUMs would be allocated to livestock (73,494 AUMs), wildlife (2,340), wild horses (2,364) and nonconsumptive uses (667 AUMs). The allocation to livestock constitutes a 27 percent increase from the 1980 actual use of 57,975 AUMs.

In the long term, implementation of grazing systems and range improvements would result in future forage production that could be as much as 106,061 AUMs. It is anticipated that this would be allocated to livestock (94,485 AUMs), wildlife (2,340 AUMs), wild horses (2,364 AUMs) and nonconsumptive uses (667 AUMs). Rest rotation (RR3) grazing system would be implemented on 45 percent of the area, deferred rotation (DR2) on 28 percent, deferred rotation (DR1) on 16 percent and other on 11 percent.

Proposed range improvements include 176 miles of fence, 8 springs, 62 miles of pipeline, 5 wells, 10 reservoirs, and 10 waterholes. Vegetation manipulation is proposed for 58,314 acres and would consist of 51,703 acres of brush control and seeding, 2,611 acres brush control only and 4,000 acres seeding only. Brush control would consist of spraying with 2,4-D herbicide or burning.

VICINITY MAP
RILEY EIS



Three alternatives to the proposed action were analyzed:

1. **No action -** Under this alternative, there would be no change from present management conditions. The existing forage production would be allocated to livestock (73,494 AUMs), wildlife (2,340 AUMs), wild horses (2,364 AUMs), and nonconsumptive uses (667 AUMs). Spring/summer grazing system would continue on 46 percent of the area, rest rotation (RR3) on 19 percent, rest rotation (RR1) on 13 percent and others on 22 percent. No additional range improvement projects or grazing systems would be undertaken.

2. **Emphasize Livestock Grazing -** In the long term, this alternative would provide 6,205 AUMs more than the proposed action from implementation of the following additional improvements: 25,109 acres brush control and seed, 382 acres brush control, 13 waterholes, 33 reservoirs, 56 miles of fence. Deferred rotation (DR1) grazing system would be implemented on 42 percent of the area, deferred rotation (RR2) on 28 percent, rest rotation (RR3) on 18 percent and others on 12 percent. The wild horse numbers would be 30 in the Palomino Buttes herd management area and 60 in the Warm Springs herd management area. All riparian areas would be grazed by livestock except Seiloff Springs area. The initial allocation of forage production would be the same as for the proposed action for wildlife and nonconsumptive uses, 1,284 AUMs less for wild horses and 1,284 more for livestock.

3. **Emphasize Non-livestock Grazing Values -** In the long term, this alternative would provide 9,497 AUMs less than the proposed action. The following additional range improvements above the proposed action level would be implemented: 4 miles of fence, 5 springs, and 30 reservoirs. Other range improvements would be less than the proposed action level as follows: 27 miles of pipeline, 3 wells, 1 waterhole, 32,241 acres brush control and seed and 2,611 acres brush control. Livestock grazing would be excluded from all perennial streams and other important riparian areas except for water gaps. Livestock would be excluded from the wild horse herd management areas (48 percent of the EIS area). Deferred rotation (DR2) grazing system would be implemented on 28 percent of the area, deferred rotation (DR1) on 11 percent and others on 13 percent. Wildhorses would be allowed to increase to 210 in Palomino Buttes and 1,093 in Warm Springs.

ENVIRONMENTAL CONSEQUENCES

Vegetation

Under the proposed action and Alternatives 2 and 3, forage conditions would improve, livestock forage production would increase and total residual ground cover would decrease. Alternative 1 would result in a decline in forage condition, an unquantified decrease in livestock forage production and a decrease in total residual ground cover. The proposed action and Alternative 3 would result in significant increases in woody key species on poor and fair condition riparian areas. Alternatives 1 and 2 would result in decreases in woody species in these areas. The standard procedures and design elements would prevent impacts to proposed threatened, endangered and sensitive plants from construction of range improvements. The impacts from other aspects of the grazing management program on these plant species are unknown.

Soils

Erosion would be slightly decreased under the proposed action and Alternatives 2 and 3 due to the increase in the proportion of residual ground cover composed of perennial vegetation. Erosion would increase on allotments with increases over 1980 use levels under Alternative 1. Streambank erosion would significantly decrease under Alternative 3 and the proposed action. Increases in streambank erosion would occur as a result of the implementation of Alternatives 1 and 2.

Water

No change in the amount of runoff would occur under any of the alternatives. Sediment yield would decrease under the proposed action and Alternatives 2 and 3. Under Alternative 1, sediment yield would increase over present levels.

Wildlife

The proposed action and Alternatives 2 and 3 would support a slight increase in deer numbers. Alternative 1 would maintain existing populations. Antelope population are expected to increase slightly under the proposed action and Alternatives 2 and 3. Small mammals and bird numbers would increase significantly in riparian areas under the proposed action and Alternative 3. There would be only a slight increase under Alternative 2 with a possible decline under Alternative 1. Increased fish production can be expected on Hay Creek under the proposed action and Alternative 3, and Wickiup Creek under the

proposed action and all alternatives. Production would remain the same in all other streams and reservoirs. Water associated bird (waterfowl) production would increase slightly under Alternatives 1 and 2, moderately under the proposed action and greatly under Alternative 3. There would be no change in upland game bird populations under the proposed action and Alternative 1 with a slight decrease under Alternative 2 and a slight increase under Alternative 3.

Wild Horses

Temporary disturbances to wild horses would occur during the period of construction of range improvements under the proposed action and Alternative 2. Wild horses would be allocated sufficient forage to provide for a maximum total population of 1,303 head under Alternative 3; 260 head under the proposed action and Alternative 1; and 90 head under Alternative 2.

Recreation

Projected visitor use to 1990 would not be significantly impacted under any alternative. As a result of impacts to recreational experiences and recreation-related wildlife populations, visitor use reductions would tend to balance increases in visitor use in activities beneficially impacted. Under all alternatives, area-wide 1990 projected visitor use for public lands in the EIS area would show an estimated 24 percent increase over existing levels for a total of about 148,000 visitor days.

Cultural Resources

Appropriate measures would be taken to identify and protect cultural sites prior to ground-disturbing activities. No impacts would occur to known cultural sites of significance.

Visual Resources

Certain portions of the EIS area may experience slight degradation of visual quality due to contrast created by range improvements and some grazing systems. Project design features, as well as VRM program procedures and constraints, would minimize land form and vegetative contrast. In the long term, visual quality would improve as range condition improves.

Special Areas

No impacts would occur to the South Narrows potential Area of Critical Environmental Concern (ACEC) under any alternative. No impacts would occur to the Section 8 potential Research Natural Area (RNA) under the proposed action or Alternatives 1 and 3. Under Alternative 2, the area would be open to livestock grazing resulting in vegetative disturbance, soil compaction and erosion.

Socioeconomics

Two operators would lose public forage exceeding 10 percent of their total annual forage requirements in the short term under the proposed action and Alternatives 1 and 2. Under Alternative 3, 12 operators would lose more than 10 percent of their annual requirements. In terms of their month-to-month requirements, under Alternative 3 eight operators would lose 50 percent or more of their requirements for one or more months during the year.

Local personal income and employment in the short term would be increased under all alternatives, however, increases under Alternative 3 would be negligible. In the long term under the proposed action, income would be increased by $805,000 annually and employment by 78 jobs. Increases would also occur under the other alternatives.

PURPOSE AND NEED

This environmental impact statement (EIS) analyzes the impacts of implementing a livestock grazing management program on public lands administered by the Bureau of Land Management (BLM) in the Burns District in south central Oregon. This area is referred to as the Riley EIS area.

The BLM is responsible for management of livestock grazing use on public lands in a manner that would maintain or improve the public land resources including soil, water, vegetation and wildlife habitat. The Bureau's principal authority and direction to manage lands are found in the Taylor Grazing Act of 1934, Federal Land Policy and Management Act of 1976 (FLPMA) and Public Rangelands Improvement Act of 1978.

The purpose of the proposed action is to implement planning decisions needed for management, protection and enhancement of the rangeland resources. The proposed action is a livestock grazing program consisting of vegetation allocation and implementation of grazing systems and range improvement projects. This action is needed to maintain or improve conditions. In addition to the proposed action, three alternatives will be analyzed: No Action, Optimize Livestock Grazing, and Optimize Non-Livestock values.

The proposed action is the preferred alternative and was developed through the Bureau Planning System using public input. Significant land and resource use alternatives considered during the planning process which would affect the rangeland resources are addressed in the alternatives analyzed in this EIS.

The significant issues and alternatives were defined after and as a result of a public scoping meeting in Burns, Oregon. See Appendix A for discussion of the relevance of other proposed alternatives.

The EIS, along with additional data, will provide the decisionmaker with information to select a management program considering resource conditions as well as social and economic impacts.

Chapter 1
Description of the Proposed Action and Alternatives

CHAPTER 1 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The proposed action and alternatives would directly involve grazing management for 55 allotments on 1,081,140 acres of public land in the Riley EIS area. There are an additional 56,471 acres of State land and 167,662 acres of private land within the allotments (as shown in Figure 1-1).

Most allotment-specific data are displayed in Appendix B. In the proposed action and all alternatives, unallotted status (no authorized grazing) would be continued on 11,867 acres of public lands as shown on Figure 1-1. No range improvements, allocations or grazing systems are planned on these unallotted lands.

In addition to the proposed action, the following alternatives are analyzed in this document:

Alternative 1 No Action
Alternative 2 Emphasize Livestock Grazing
Alternative 3 Emphasize Non-Livestock Grazing Values

The alternatives differ from the proposed action in three ways: (1) the allocation of vegetation, (2) the types of grazing systems to be applied and (3) the kind and amount of range improvements to be constructed. The Components of the Proposed Action and Alternatives section in this chapter describes these three elements. Table 1-1 summarizes the components of the proposed action and alternatives.

PROPOSED ACTION

The general objective of the proposed action is to implement intensive grazing management (grazing systems and range improvements) to improve and/or maintain vegetation condition to benefit wildlife and livestock.

The proposed action would:

- Manage livestock use in riparian areas by exclusion and/or other grazing systems.

- Allocate competitive forage to meet big game needs.

- Provide for a diversity of wildlife habitat to allow for a variety of wildlife species.

- Protect water quality in those watersheds with major down stream water uses including sport fisheries and agriculture.

- Maintain wild horse numbers based on existing wild horse herd management plans.

Initially, the proposal would allocate the present livestock forage production of 78,865 Animal Unit Months (AUMs) to: livestock (73,494), wild horses (2,364), wildlife (2,340) and nonconsumptive uses (667). The initial allocation to livestock would result in an increase of 15,519 AUMs because actual use during 1980 (the base year) was 57,975 AUMs. The current use level of competitive forage is the same as the proposed level for wildlife and wild horses. Additional use of non-competive forage would occur by wild horses and wildlife. The existing livestock use and proposed vegetation allocation by allotment are shown in Appendix B, Table B-1.

Over the 15-year period following full implementation, the proposed action is expected to increase annual forage production by 20,896 AUMs. Actual decisions on the allocation of increased forage will not be made until the forage is produced and all needs at that time are considered through the Bureau planning system.

Existing and proposed grazing systems by allotment are shown in Appendix B, Table B-2. See Components of the Proposed Action and Alternatives section of this chapter for a description of each grazing system.

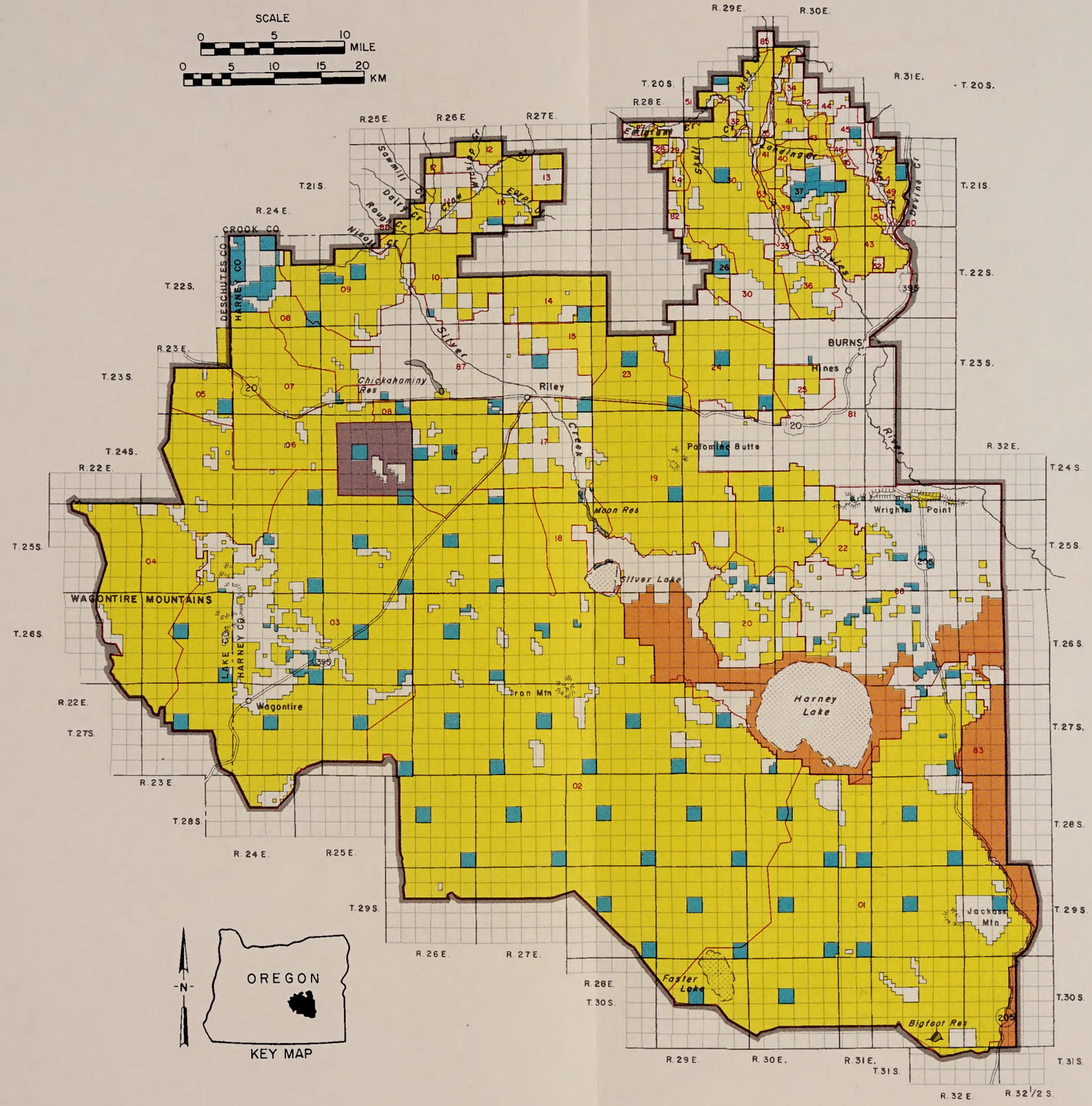
Varying levels of livestock exclusion are proposed. Table 1-2 summarizes the acreage by type of exclusion. Exclusions at springs, streams, reservoirs and playas are proposed in order to maintain or improve riparian wildlife habitat, soil stability and water quality. The South Narrows proposed Area of Critical Environmental Concern (ACEC), an existing exclosure, is designed to protect a population of Malheur wirelettuce **(Stephanomeria malheurensis)** which is proposed for endangered species listing by the U.S. Fish and Wildlife Service. One exclosure is proposed in order to eliminate conflicts in the Radar Hill area between off-road recreational vehicles and livestock. Livestock would be temporarily excluded along three stream riparian areas (which comprise a total of 716 acres) until resource objectives of the areas are met. Grazing would then resume in these three areas under restrictive management which would maintain the condition of the exclusion areas at the new level.

Additional range improvements may be needed to implement intensive grazing management. Exact numbers and economic feasibility of improvements have not been determined. However, Appendix B, Table B-3, presents an approximate number and type of water development, miles of fence and acres of vegetation manipulation needed to implement the proposed grazing systems. Proposed vegetation manipulation would involve treating a maximum of 60

Table 1-1 Summary of Components

Initial Allocation (AUMs)	1980 Forage Consumption	Proposed Action	ALT. 1 No[1] Action	ALT. 2 Emphasize Livestock	ALT. 3 Emphasize Non-Livestock
Wildlife	2,340	2,340	2,340	2,340	2,340
Wild Horses	2,364	2,364	2,364	1,080	14,879
Nonconsumptive	0	667	667	667	7,049
Livestock	57,975	73,494	73,494	74,778	54,597
Long Term Allocation(AUMs)					
Wildlife		2,340	2,340	2,340	2,340
Wild Horses		2,364	2,364	1,080	14,879
Nonconsumptive		667	667	667	7,049
Livestock		94,485	73,494	101,974	66,091
Grazing Systems (acres)					
Spring (EA)		12,599	6,790	12,609	12,599
Spring/Summer (SS)		1,434	488,805	1,434	1,234
Deferred (DF)		12,507	34,497	12,507	11,582
Deferred Rotation 1 (Annual) (DR1)		166,939	60,723	449,991	121,903
Deferred Rotation 2 (Biannual) (DR2)		296,640	83,258	297,147	294,860
Rest Rotation 1 (3 pasture) (RR1)		37,355	134,429	37,355	37,355
Rest Rotation 2 (2 pasture) (RR2)		32,545	32,537	32,545	32,045
Rest Rotation 3 (2 pasture) (RR3)		477,218	197,405	195,454	20,186
Exclusion (EX)		1,643	858	260	508,212
Temporary Exclusion (TEX)		716	224	224	0
Fenced Federal Range (FFR)		29,677	29,747	29,747	29,297
Unallotted (UNA)		11,867	11,867	11,867	11,867
Proposed Range Improvements					
Fences (miles)		176	0	232	180
Springs (each)		8	0	8	13
Pipelines (miles)		62	0	62	35
Wells (each)		5	0	5	2
Reservoirs (each)		10	0	43	40
Waterholes (each)		10	0	23	9
Brush control/seed (acres)		51,703	0	76,812	19,462
Brush control only (acres)		2,611	0	2,993	0
Seed only (acre)		4,000	0	4,000	4,000

[1] Livestock allocations for the No Action Alternative represent the 1980 active preference.



U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
BURNS DISTRICT

RILEY GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982

LEGEND

- Public Land
- Malheur National Wildlife Refuge
- State Land
- Squaw Butte Experiment Station
- Private

Allotment Numbers and Names

7001 East Warm Springs	7032 Hotchkiss
7002 West Warm Springs	7033 Silvies River
7003 East Wagontire	7034 Scat Field
7004 West Wagontire	7035 Silvies Meadow
7005 Glass Butte	7036 Hayes
7006 Rimrock Lake	7037 Coal Pit Springs
7007 Hat Butte	7038 Curry Gordon
7008 Sheep Lake - Shields	7039 Cave Gulch
7009 Dry Lake	7040 Landing Creek
7010 Claw Creek	7041 East Silvies
7011 Upper Valley	7042 Dole Smith
7012 Pack Saddle	7043 Lone Pine
7013 Zoglmann	7044 Cowing
7014 Badger Spring	7045 Whiting
7015 Second Flat	7046 Baker Hill Field
7016 Juniper Ridge	7047 Pea Body
7017 Cluster	7048 Varien Canyon
7018 Silver Lake	7049 Forks of Poison Creek
7019 Palomino Buttes	7050 Clemens
7020 Sand Hollow	7051 Sawtooth MNF
7021 Weaver Lake	7052 Lone Pine Field
7022 Dog Mountain	7053 Silvies Canyon
7023 West Sagehen	7054 Cricket Creek
7024 East Sagehen	7080 Devine Canyon
7025 Gouldin	7081 Harney Basin
7026 Horton Mill	7082 Hines Field
7027 Emigrant Creek	7083 Malheur Refuge
7028 Stinger Creek	7085 Rainbow Creek
7029 Spring Creek	7086 Rough Creek
7030 Skull Creek	7087 Silver Creek Valley
7031 Hay Creek	7088 Sunset Valley

Allotment Boundary

NOTE: Map numbers refer to last two digits of allotment numbers. Allotments 7080 thru 7088, inclusive, are unalloted status.

FIGURE 1-1
LAND STATUS and ALLOTMENTS

Table 1-2 Proposed Livestock Exclusion Areas by Alternative

	Proposed Action			Alt.1, No Action			Alt. 2, Emphasize Livestock			Alt. 3, Emphasize Non-Livestock		
	Number	Riparian Acres	All Acres	Number	Riparian Acres	All Acres	Number	Riparian Acres	All Acres	Number	Riparian Acres	All Acres
Stream (miles)	-	143	1,373	-	26	811	-	19	188	-	308	4,533
Spring (each)	2	54	140	1	35	60	1	35	60	2	54	140
Reservoirs (each)	3	12	40	1	6	15	-	-	-	4	14	80
Playas (each)	2	-	570	-	-	-[1]	-	-	-	9	-	5,092[2]
Radar Hill (each)	1	-	40	-	-	-	1	-	40	1	-	40
South Narrows ACEC (each)	1	0	160	1	0	160	1	0	160	1	0	160
Wild Horse Herd Management Areas	-	-	-	-	-	-	-	-	-	2	-	140,140
Total	-	209	2,323	-	67	1,046	-	54	448	-	376	500,185

[1] 440 Playa acres, 130 upland acres
[2] 4,210 Playa acres, 882 upland acres

percent of the potential area as shown on Figure 1-2. Up to 50 percent of the brush could be removed within any sage grouse wintering ground or within 2 miles of any strutting ground. In the long term, implementation of vegetation manipulation projects would produce an additional 11,353 AUMs and implementation of the proposed grazing management would result in an additional 9,543 AUMs of forage.

ALTERNATIVE 1 - NO ACTION

This alternative constitutes a continuation of the present situation. There would be no change from present management conditions. Grazing permits would continue to be issued at present levels of use. As shown in Appendix B, Table B-1, the vegetation allocation would continue at the present level of 73,494 AUMs for livestock, 2,364 AUMs for wild horses and 2,340 AUMs for wildlife. For purposes of impact analysis, it is assumed that no additional range improvement projects would be undertaken or additional intensive grazing management implemented. It is also assumed that livestock grazing would be at the active preference level of 73,494 AUMs. By periodic control measures as described in the Wild Horse Herd Management Plans, wild horse numbers would be maintained at 60 head in the Palomino Buttes Herd Management Area and 200 head in the Warm Springs Herd Management Area. See Table 1-2 for livestock exclusion by alternative and Appendix B, Table B-2, for acres under each grazing system.

ALTERNATIVE 2 - EMPHASIZE LIVESTOCK GRAZING

The objective of this alternative would be to allocate a high level of forage to livestock while maintaining or improving range conditions. (See Appendix B, Table B-1, for anticipated long-term vegetation allocation.)

This alternative would differ from the proposed action in the following ways:

- Provide for livestock grazing in all riparian areas except the Seiloff Springs area.
- Develop all identified practical and economically feasible range improvements required to implement management for the benefit of livestock.
- Manage wild horses for minimum viable herd sizes of 30 animals in the Palomino Buttes Herd Management Area and 60 animals in the Warm Springs Herd Management Area.

Proposed range improvements by alternative are shown in Appendix B, Table B-3. The vegetation manipulation projects would be designed to treat 80 percent of the total area as compared to 60 percent under the proposed action (Figure 1-2). Up to 100 percent of the brush could be removed within any sage grouse wintering ground or within any strutting ground.

The primary differences in grazing systems between Alternative 2 and the proposed action are: (1) approximately 25 percent of the area would be under rest rotation grazing management compared to about 50 percent under the proposed action and (2) most of the riparian and playa areas excluded under the proposed action would be grazed by livestock under Alternative 2. See Appendix B, Table 2, which shows acres by grazing system for each alternative.

ALTERNATIVE 3 - EMPHASIZE NON-LIVESTOCK VALUES

The objective of this alternative would be to emphasize non-livestock values (wildlife, wild horses, water quality) in those areas where conflicts with livestock grazing have been identified.

This alternative would differ from the proposed action in the following ways:

- Exclude livestock from all except 2.7 miles of perennial streams and other important riparian areas except for water gaps (See Glossary).
- Remove livestock from Palomino Buttes and Warm Springs Wild Horse Herd Management Areas to allow maximum wild horse numbers (210 in Palomino Buttes and 1,093 in Warm Springs) consistent with maintenance of wildlife and other resource values.

• Design vegetation treatment projects to maximize edge effect and habitat diversity.

Livestock grazing would not be allowed in the wild horse herd management areas except on the existing seedings and fenced Federal range pastures (28,882 acres). In these areas, big game needs would be considered before the wild horse use. No range improvements would be constructed in the wild horse herd management areas. In areas outside of the wild horse herd management areas, livestock grazing would be at the same level as the proposed action initially. See Appendix B, Table B-1, for the initial and long-term forage allocations.

The vegetation manipulation projects would be designed to treat only 40 percent of the total area as compared to 60 percent under the proposed action (see Figure 1-2). This would allow for a greater mix of treated versus untreated areas. No brush would be removed within any sage grouse wintering ground or within 2 miles of any strutting ground.

In general, grazing systems would be the same as for the proposed action except where livestock would be excluded. Livestock grazing would not be allowed in any proposed exclusion areas. See Table 1-2 for exclusions by alternatives and Appendix B, Table B-2, for grazing systems.

COMPARISON OF IMPACTS

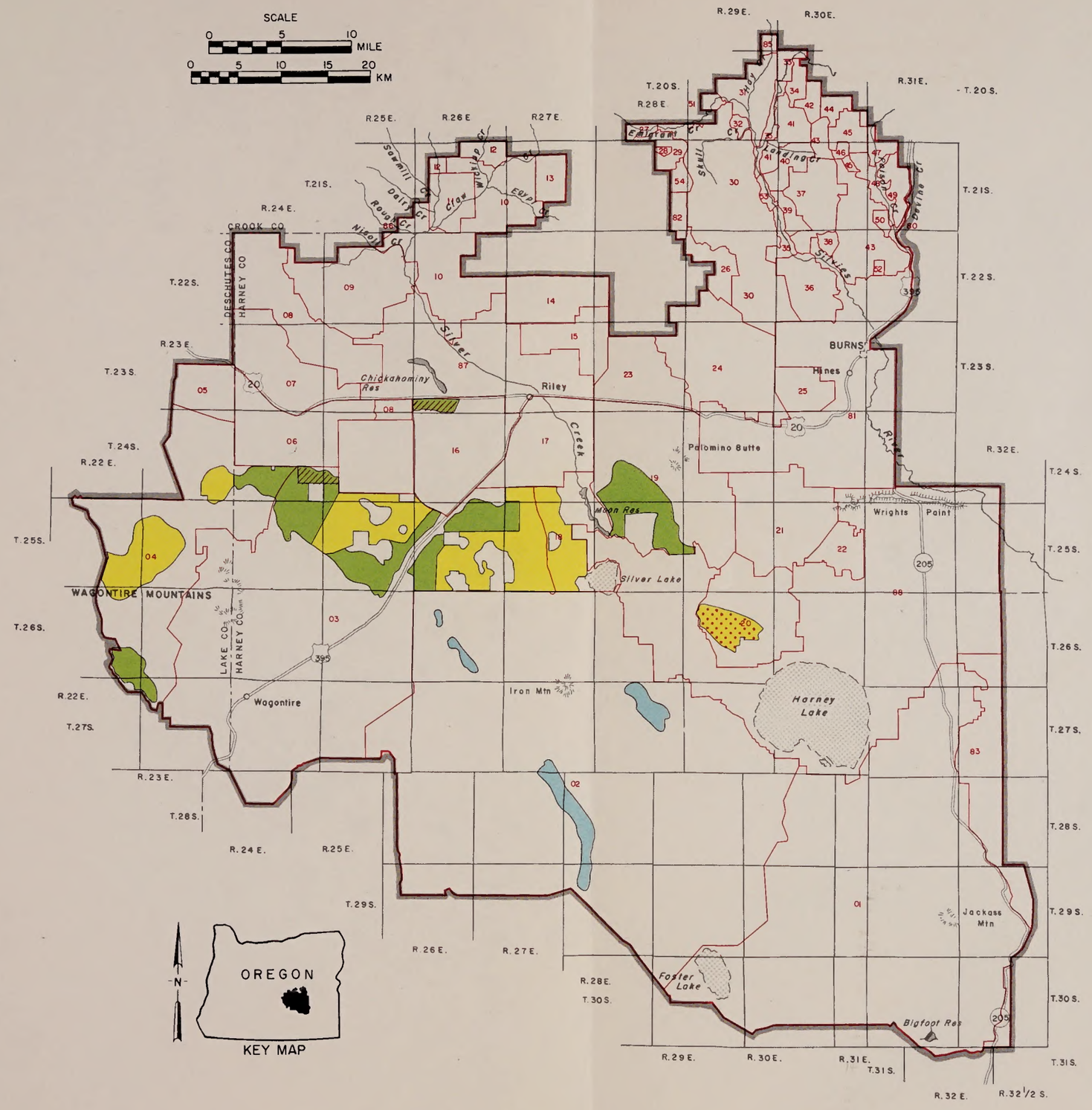
A summary of the comparison of impacts is displayed in Table 1-3. Detailed explanations of the impacts are given by resource in Chapter 3.

Table 1-3 Summary Comparison of Long-Term Impacts of the Proposed Action and Alternatives

Significant Resource	Existing Situation	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Livestock
Soils					
Erosion		+L	-L	+L	+L
Streambank erosion		+L	-L	-L	+M
Water					
Runoff		NC	NC	NC	NC
Fecal coliforms		+L	-L	-L	+L
Sediment yield		+L	-L	-L	+L
Vegetation					
Range condition (1,081,140 acres total)					
Good	26%	34%	30%	37%	32%
Fair	51%	50%	39%	49%	48%
Poor	22%	15%	30%	13%	19%
Unknown	1%	1%	1%	1%	1%
Total Residual ground cover		-L	-L	-L	-L
Forage production (AUMs)	78,865	99,274	78,865	106,809	91,833
Riparian		+M	-L	-L	+H
Wildlife Populations					
Deer		+5-20%	NC	NC	+5-20%
Antelope		+10-20%	NC	+10-20%	+10-20%
Small mammals		-L	NC	-L	+L
Water-Associated birds		+M	+L	+L	+H
Upland game birds		NC	NC	-L	+L
Other birds		-L	NC	-L	+L
Reptiles		-L	NC	-L	+L
Amphibians		+L	NC	NC	+L
Wild Horses (Numbers)	532	260	260	90	1,303
Recreation					
Experience degradation		-L	NC	-L	-L
Visual Resources(Contrast)		-L	NC	-L	-L
Potential Research Natural Areas					
Degradation		NC	NC	-L	NC
Socioeconomics [1]					
Local personal income: (in $1000's)		+ $805	+ $342	+ $971	+$172
Local employment (jobs)		+78	+33	+95	+17

Note: NC = no change, + = beneficial, - = adverse, L = low, M = medium, H = high

[1]Socioeconomic impacts are shown as changes from the existing situation. Personal income (at annual rates) is in thousands of 1978-80 dollars.



U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
BURNS DISTRICT

RILEY GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982

LEGEND

BRUSH CONTROL AND SEEDING

- Emphasize Non-Livestock Grazing Values
- Proposed Action
- Emphasize Livestock Grazing
- Brush Control Only
- Seeding Only

NOTE Vegetation Manipulation Areas shown represent outside boundaries. Percentage of area to be treated varies by alternative

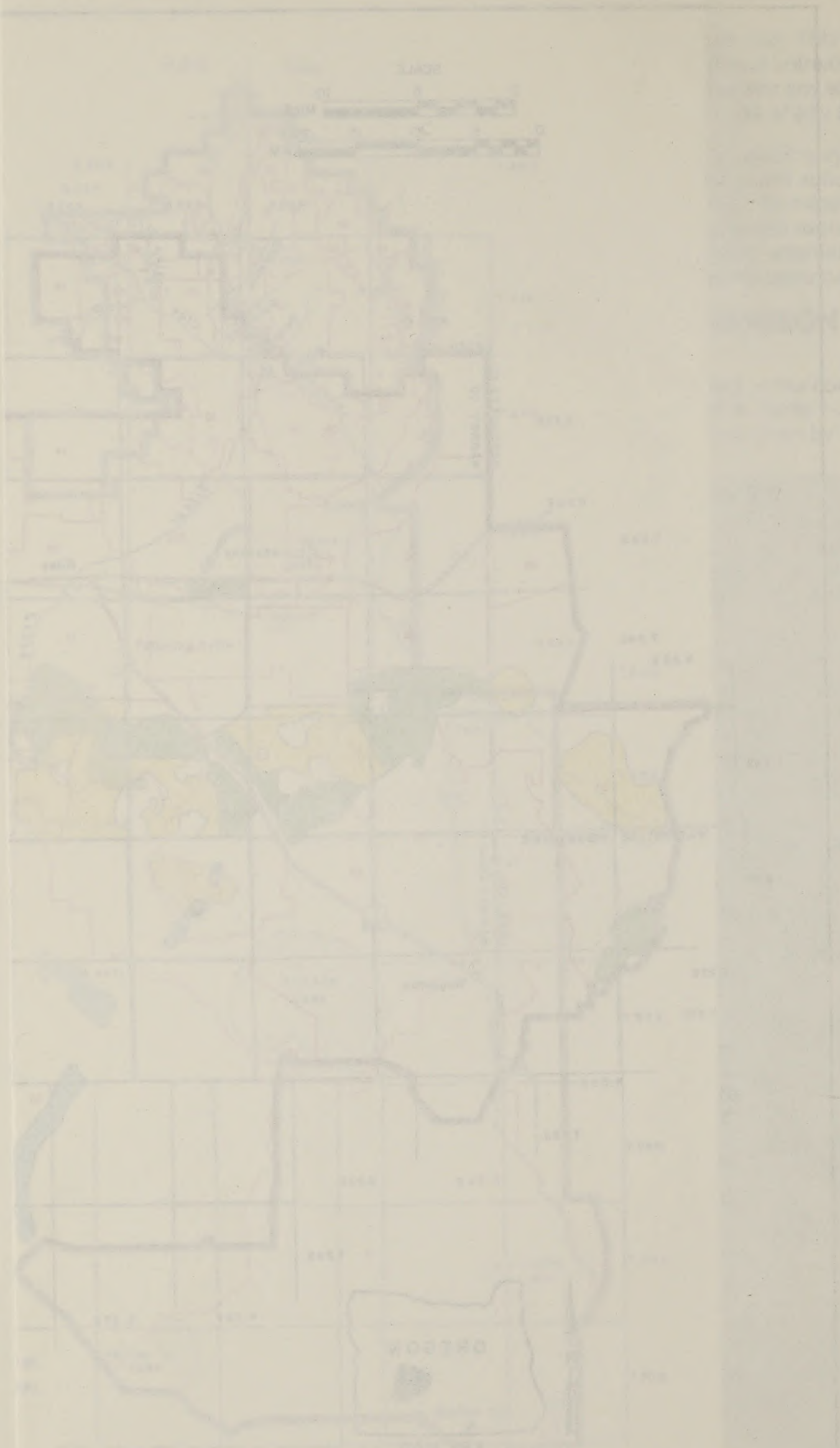
Allotment Numbers and Names

7001 East Warm Springs	7032 Hotchkiss
7002 West Warm Springs	7033 Silvies River
7003 East Wagontire	7034 Scat Field
7004 West Wagontire	7035 Silvies Meadow
7005 Glass Butte	7036 Hayes
7006 Rimrock Lake	7037 Coal Pit Springs
7007 Hat Butte	7038 Curry Gordon
7008 Sheep Lake - Shields	7039 Cave Gulch
7009 Dry Lake	7040 Landing Creek
7010 Claw Creek	7041 East Silvies
7011 Upper Valley	7042 Dole Smith
7012 Pack Saddle	7043 Lone Pine
7013 Zoglmann	7044 Cowing
7014 Badger Spring	7045 Whiting
7015 Second Flat	7046 Baker Hill Field
7016 Juniper Ridge	7047 Pea Body
7017 Cluster	7048 Varien Canyon
7018 Silver Lake	7049 Forks of Poison Creek
7019 Palomino Buttes	7050 Clemens
7020 Sand Hollow	7051 Sawtooth MNF
7021 Weaver Lake	7052 Lone Pine Field
7022 Dog Mountain	7053 Silvies Canyon
7023 West Sagehen	7054 Cricket Creek
7024 East Sagehen	7080 Devine Canyon
7025 Gouldin	7081 Harney Basin
7026 Horton Mill	7082 Hines Field
7027 Emigrant Creek	7083 Malheur Refuge
7028 Stinger Creek	7085 Rainbow Creek
7029 Spring Creek	7086 Rough Creek
7030 Skull Creek	7087 Silver Creek Valley
7031 Hay Creek	7088 Sunset Valley

Allotment Boundary

NOTE Map numbers refer to last two digits of allotment numbers. Allotments 7080 thru 7088, inclusive, are unalloted status.

FIGURE 1-2
PROPOSED VEGETATION MANIPULATION



COMPONENTS OF THE PROPOSED ACTION AND ALTERNATIVES

The proposed grazing management is composed of three elements which are interdependent. For purposes of analysis, they are described separately below and in Chapter 3, Environmental Consequences.

Vegetation Allocation

The vegetation allocation proposed for each alternative would allocate the existing and future livestock forage production to various uses including wildlife, wild horses, livestock and nonconsumptive uses. For the purpose of allocation, the wild burros are included with the wild horses. The allocation under the proposed action is designed to provide sufficient forage to maintain wild horse populations at the herd management plan levels, meet Oregon Department of Fish and Wildlife (ODFW) population objectives and make available increased amounts of forage for livestock. Appendix C describes the methodology used in determining the proposed allocations. Appendix B, Table B-1, shows the initial and long-term vegetation allocation for the proposed action and alternatives. The allocations for the alternatives are designed to emphasize different uses under each alternative. By implementing grazing management and range improvements, it is anticipated that the existing level of forage production would increase.

Grazing Systems

A grazing system consists of one or more planned grazing treatments which use livestock grazing to bring about changes in or maintenance of the kind and amount of vegetation. The accomplishment of vegetative objectives are determined by measuring vigor, reproduction and composition of key species. Key species are those plants which serve as indicators of objective accomplishment in the vegetation communities. Grazing systems which allow plants to complete the growth stages (see Table 1-4) generally result in increases in, or maintenance of, key species. In the Riley EIS area, the critical part of the growing season normally occurs from May 1 to July 15. An improvement in range condition is normally due to an increase of the key species and conversely, a deterioration of range condition is normally the result of a decrease in the key species. See Appendix B, Table B-2, for proposed grazing systems by allotment and pasture for each alternative. Abbreviation of grazing system names are used in the appendix and included in parentheses in the following discussion.

Although each of the following descriptions outlines the typical period of grazing use, there is some variation among the different allotments. Figure 1-3 shows examples of the proposed systems with sequence of treatments. Figure 1-4 presents a comparison of the percentage of the EIS area under the main grazing sustems for each alternative.

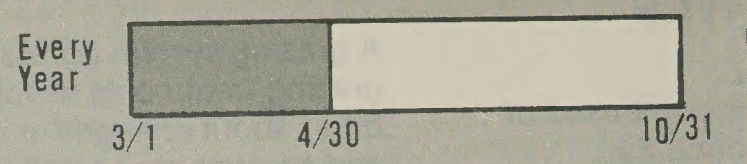
Table 1-4 Approximate Growth Stage Dates for Key Species [1]

Species [2]	Start of Growth	Peak of Flowering	Seed Ripe	Dormancy
Bluebunch wheatgrass	3/20	6/15	7/15	9/1
Basin wildrye	4/1	6/25	7/25	9/15
Idaho fescue	3/15	6/15	7/15	8/15
Crested wheatgrass [3] [4]	3/1	6/15	7/15	8/15
Squirreltail	3/10	6/5	7/5	8/1
Thurber's needlegrass	3/20	6/1	7/1	9/1
Sandberg bluegrass [4]	3/1	5/15	7/1	7/15
Bitterbrush [5]	4/15	6/1	7/1	10/1

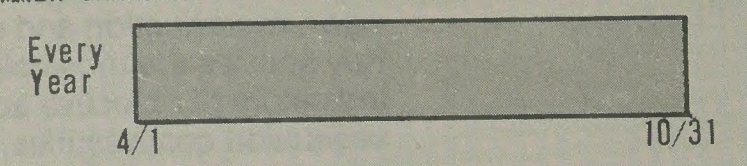
[1]Average year at the 4,500 foot elevation.
[2]Scientific names for the plants listed are shown in Appendix D.
[3]Key species for seeded areas.
[4]Key species for deer and antelope spring range.
[5]Key species for deer winter range.

FIGURE 1-3 EXAMPLES OF TYPICAL GRAZING SYSTEMS OF TREATMENT BY PASTURE

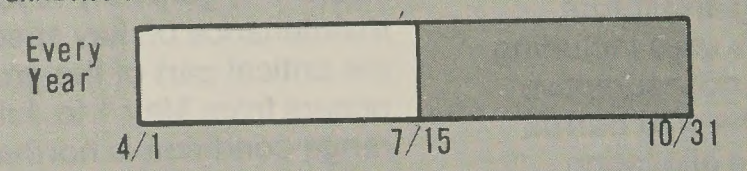
SPRING GRAZING:



SPRING/SUMMER GRAZING:

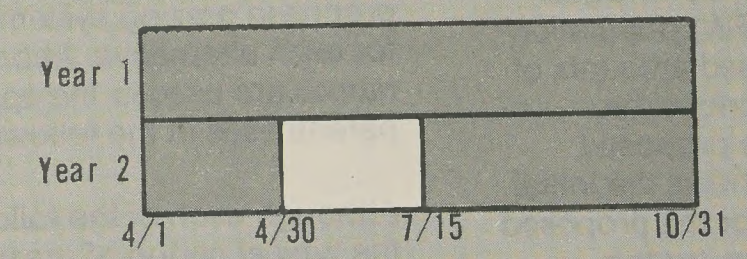


DEFERRED GRAZING:

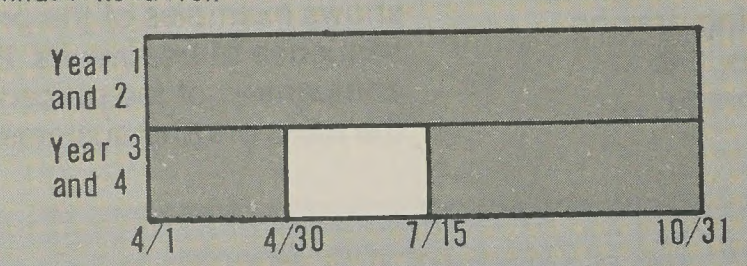


DEFERRED ROTATION:

1. Annual Rotation

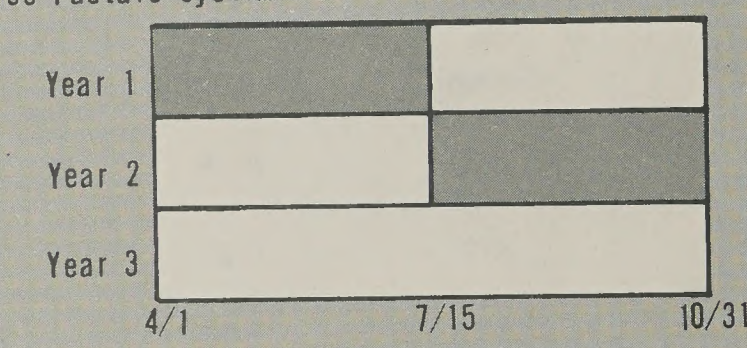


2. Biannual Rotation

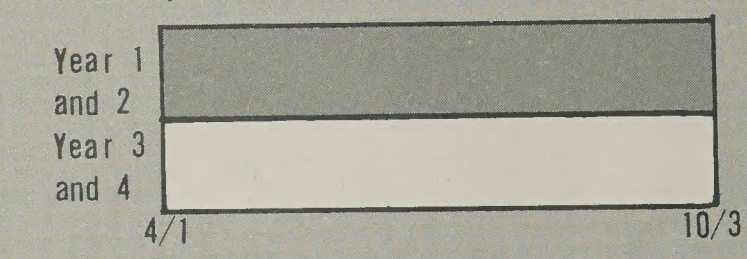


REST ROTATION:

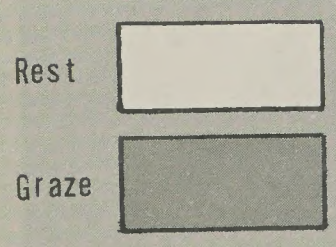
1. Three Pasture System



2. Two Pasture System (Biannual Rotation)



LEGEND



3. Two Pasture System (Annual Rotation)

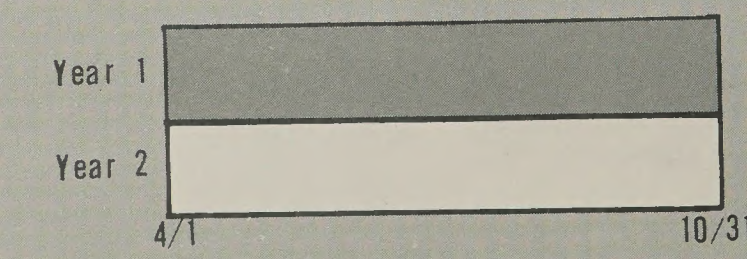
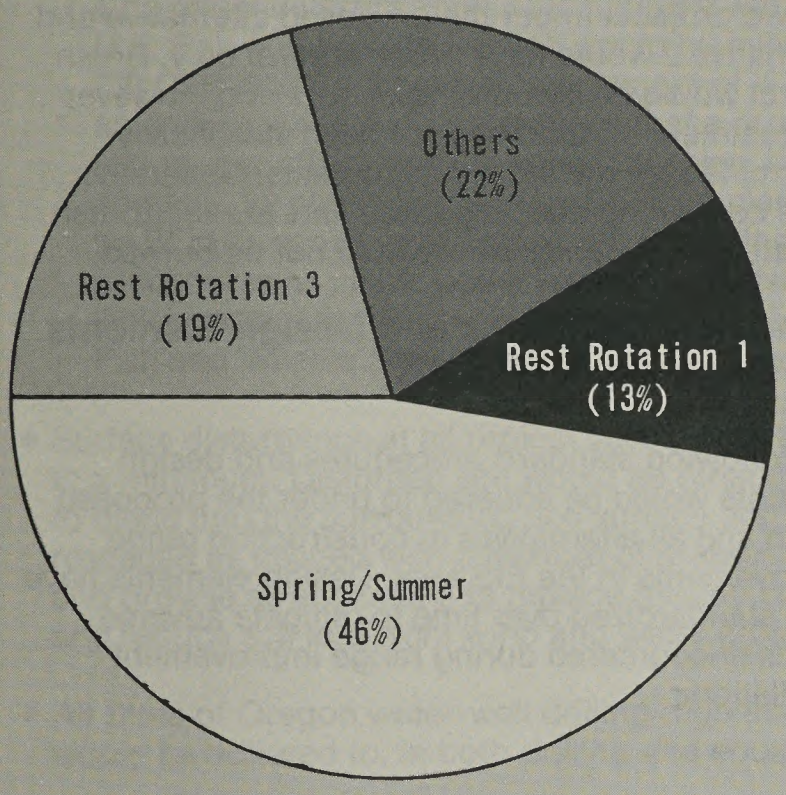
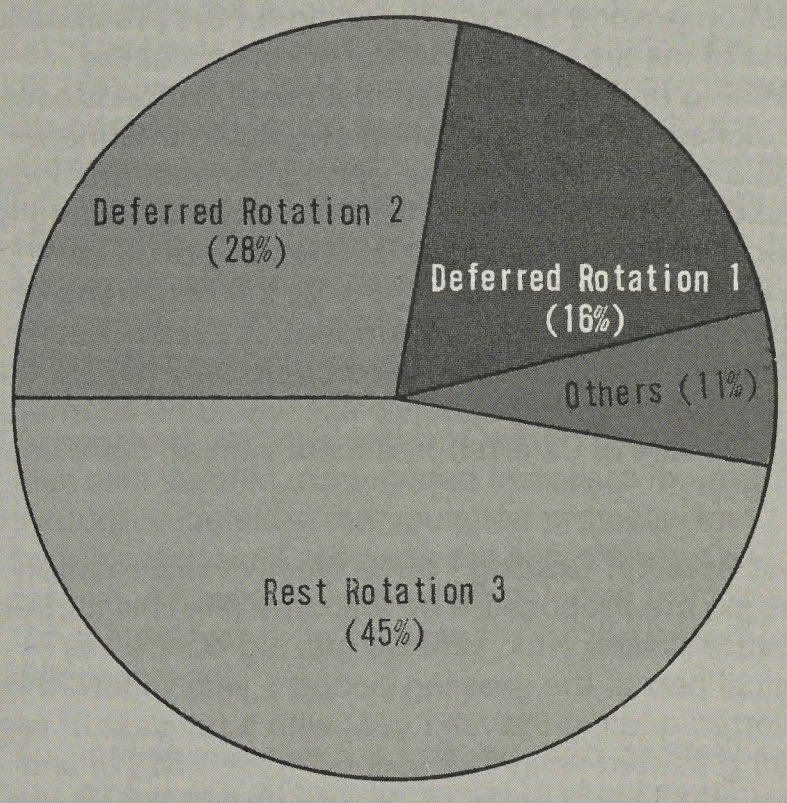


FIGURE 1-4
PERCENTAGE OF AREA UNDER GRAZING SYSTEMS BY ALTERNATIVE

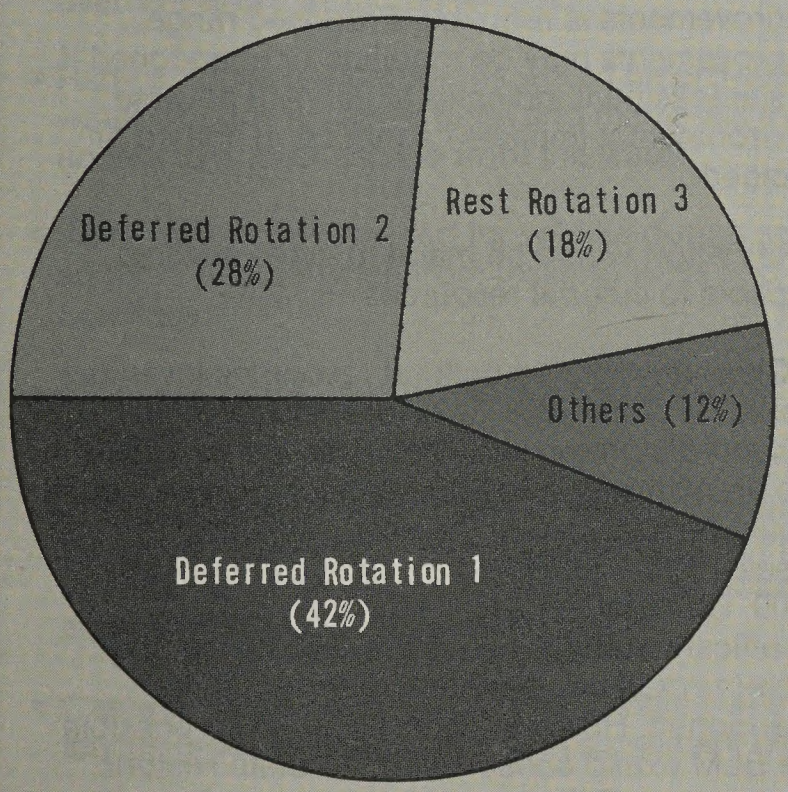
EXISTING SITUATION AND ALTERNATIVE 1 (NO ACTION)



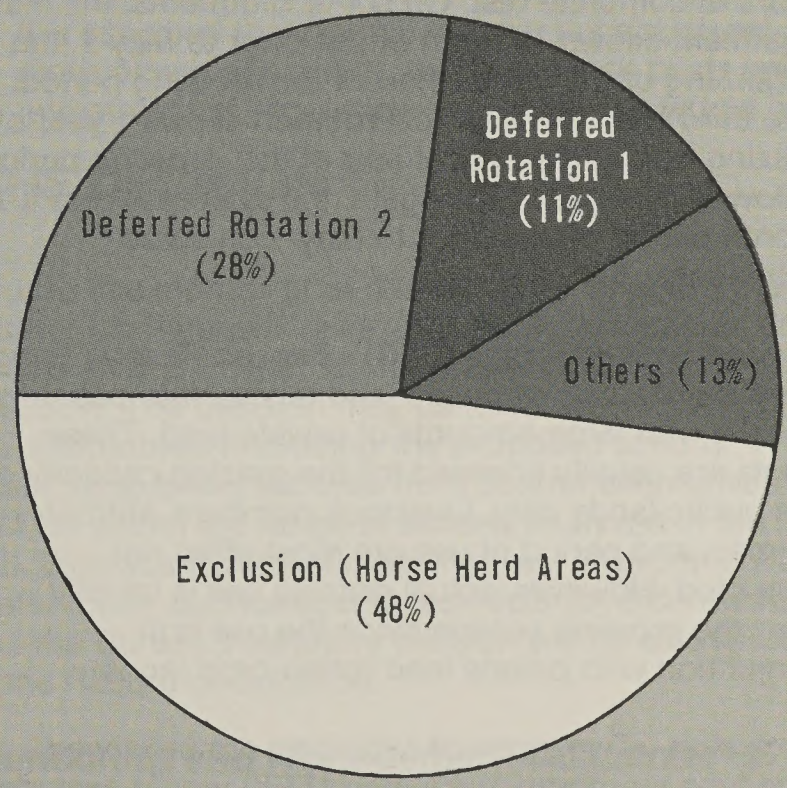
PROPOSED ACTION



ALTERNATIVE 2 (EMPHASIZE LIVESTOCK)



ALTERNATIVE 3 (EMPHASIZE NON LIVESTOCK)



Spring grazing (EA) - grazing occurs for 1 to 2 months prior to May 1, the beginning of the critical growth period. Livestock are utilizing primarily the previous year's growth although some use of the early green growth occurs under this system.

Spring/Summer Grazing (SS) - grazing occurs during the critical growth period every year.

Deferred Grazing (DF) - grazing occurs after seedripe every year. No grazing occurs during the critical growth period.

Deferred Rotation Grazing - two types of deferred rotation grazing occur depending on the precipitation zone of the area of use. In the north end of the planning unit where the annual precipitation is over 12 inches, an annual rotation of grazing treatment would occur (DR1); that is, spring/summer grazing would be alternated with deferred grazing. During the year of deferred treatment, a 1 month period of spring grazing may occur prior to the beginning of the critical growth period. Under this system each treatment would be alternated biannually (DRR); that is, 2 years of spring/summer use would be alternated with 2 years of deferred treatment with an early use period.

Rest Rotation Grazing - three types of rest rotation grazing are proposed. The first type (RR1) is a three pasture system which allows grazing during the critical part of the growing period 1 year followed by deferred grazing the next year with a full year of rest during the 3rd year. The second type (RR2) of rest rotation allows 2 years of grazing during the critical part of the growing period. This is followed by 2 years of complete rest. On some allotments, the rest treatment allows 1 month of use prior to May 1, the beginning of the critical part of the growing period. The third type (RR3) of rest rotation allows 1 year of grazing during the critical part of the growing period followed by 1 year rest. Again, the system allows a 1-month period of use prior to May 1 on some allotments.

Fenced Federal Range (FFR) - Fenced Federal Range consists of tracts of public land fenced into pastures, usually with large amounts of private land. These tracts are usually licensed for the grazing capacity of the public lands only. Livestock numbers, kind of animals and period of use are most often not restricted. However, actual grazing use is usually after the growing season since the use is in conjuction with private land (often crop lands).

Exclusion - Two types of exclusion are proposed. One type temporary exclusion (TEX) would exclude livestock grazing for a period of at least 5 years or until resource objectives are achieved. Grazing would be resumed in these areas to maintain desired management objectives. For the purpose of analysis, it is assumed that grazing in these areas would be under the same system as that of the adjoining pasture. Grazing use would be monitored to ensure that the condition of the resource is maintained at the improved level. The second type of exclusion (EX) does not allow livestock grazing to resume.

Range Improvements

Range improvements are proposed for several reasons: to implement more intensive grazing systems; to allow deferment of grazing use on native range during the spring; to improve livestock distribution; and to increase forage production. Except for 4,000 acres which have previously been burned by wildfire, all vegetation manipulation would have brush controlled prior to seeding (see Figure 1-2). Two projects under the proposed alternative and Alternative 2 would have brush control only. Brush control would be by burning or spraying; however the treatment method has not been specifically determined for the individual projects. Generally, areas containing needlegrasses and/or rabbitbrush and areas with sandy soils would not be burned.

Standard Procedures and Design Elements for Range Improvements

The following standard procedures and design elements would be adhered to under the proposed action and all alternatives in constructing range improvements in the EIS area. Design elements have been standardized over time to mitigate adverse effects encountered during range improvement installations.

- Preparation of a site-specific environmental assessment prior to implementation of range improvements is required. Proposed range improvements may be modified or abandoned if this assessment indicates significant adverse environmental impacts cannot be mitigated or avoided.

- Every effort would be made to avoid adverse impacts to cultural resources.

- A Class III intensive cultural resources inventory would be completed on all areas prior to any ground-disturbing activities. This would be part of the preplanning stage of a project and the results would be analyzed in the environmental assessment addressing the action (BLM Manual 8100, CulturalResources Management). If significant cultural values are discovered, the project could be relocated, redesigned or abandoned. However, where that is not possible the BLM would consult with the State Historic Preservation Officer and the Advisory Council on Historic Preservation in accordance with the Programmatic Memorandum of Agreement (PMOA) by and between the Bureau, the Council and the National Conference of State Historic Preservation Officers, dated January 14, 1980, which sets forth a procedure for developing

appropriate mitigative measures. This PMOA identifies procedures for compliance with Section 106 of the National Historic Preservation Act (1966) and Executive Order 11593, as implemented by 36 CFR Part 800.

- Prior to vegetative manipulation and development of range improvements, BLM requires a survey of the project site for plants and animals listed or under review for listing on Federal or official State lists of threatened and endangered species. If a project might affect any such species or its critical habitat, every effort would be made to modify, relocate or abandon the project in order to obtain a no effect determination. Consultation with the U.S. Fish and Wildlife Service would be initiated (50 CFR 402; Endangered Species Act of 1973, as amended) when BLM determines that a proposed action may effect plant or animal species. In addition, 22 plants in the Riley EIS area classified by BLM as sensitive are managed under the same procedures as plants under review for Federal listing except that no consultations with the U.S. Fish and Wildlife Service would occur.

- Surface disturbance at all project sites would be held to a minimum. Disturbed soil would be rehabilitated to blend into the surrounding soil surface and reseeded as needed with a mixture of grasses, forbs and browse as applicable to replace ground cover and reduce soil loss from wind and water erosion.

- All State of Oregon water-well drilling regulations would be adhered to, in both drilling and equipping.

- Significant spring sources and associated trough overflow areas would be fenced.

- Ramps, rocks or floatboards would be provided in all water troughs for small birds and mammals to gain access to and/or escape from the water.

- Water would be provided for wildlife during spring, summer and early fall from existing wells and pipelines.

- Proposed fence lines would not be bladed or scraped.

- Proposed fence construction in antelope areas would be coordinated with Oregon Department of Fish and Wildlife. All other fences would be constructed in accordance with Bureau standards.

- Gates or cattle guards would be installed where fences cross existing roads with significant use.

- Most vegetation manipulation projects would be designed using irregular patterns, untreated patches, etc., to provide for optimum edge effect for wildlife. Layout and design would be coordinated with local Oregon Department of Fish and Wildlife biologists.

- Seeding would be accomplished by use of the rangeland drill in most cases. Broadcast seeding would occur on small disturbed areas, rough terrain and rocky areas. Preparation for seeding (brush control) would be by burning or chemical means (2,4-D). Burning would use one or more of the following types of fire breaks: natural barriers, retardant lines, existing roads and/or bladed lines. Each fire would have its own prescription, to be based on the conditions needed (wind speed, air temperature, etc.) to burn the plant material within the project boundary to be burned. The chemical applied would be 2,4-D (low volatile formulation) using a water carrier at a rate of 2 pounds active ingredients per acre. All applications of 2,4-D would be in accordance with the manufacturer's label, State regulations and BLM Manual 9220. A more thorough description of design features applicable to the proposal may be found in BLM's final environmental impact statement, **Vegetative Management with Herbicides-- Western Oregon.** Design features are also applicable in eastern Oregon. BLM would determine seeding mixtures on a site specific basis, using past experience and recommendations of the Oregon State University Extension Service and Experiment Stations and/or Oregon Department of Fish and Wildlife. Anticipated increases in production through vegetation manipulation projects would not be allocated until seedings are established and ready for use. All seedings would be deferred from grazing for at least two growing seasons to allow seedling establishment.

- It is anticipated that the existing road and trail system would provide access for range improvement construction.

  It is assumed that normal maintenance such as replacement of pipeline sections, fence posts and retreatment of vegetation manipulations would occur.

THE DECISION

Four to five months after release of the final EIS the District Manager will review the public comments on both draft and final EISs and prepare a Record of Decision. The decision may be to select one of the EIS alternatives (including the proposed action) intact, or to blend features from several alternatives that fall within the range of actions analyzed in the EIS. Significant conflicts, alternatives, environmental preferences, economic and technical considerations and the Bureau's statutory mission will be addressed in the Record of Decision.

Monitoring and Management Adjustments

A monitoring program would be developed to assure that resource objectives were being met. Studies would be conducted in allotments to determine progress toward resource objectives. Water quality monitoring would be initiated in accordance with

Executive Orders 11991 and 12088, BLM Manual 7240, and Sections 208 and 313 of the Clean Water Act (P.L. 95-217, P.L. 92-500 as amended). Standard analytical methods detailed in Federal directives would be followed.

Studies would be established in representative riparian zones to determine changes in the habitat conditions and populations of fish and wildlife resulting from implementation. Such monitoring would comply with Executive Orders 11514 and 11990 and BLM Manual 6740.

Existing browse studies would be continued. Wildlife habitat would be monitored in cooperation with Oregon Department of Fish and Wildlife to determine the effectiveness of design features for vegetation manipulation and grazing systems.

Climate, actual use, utilization and trend studies would be conducted in accordance with BLM Manuals 4412 and 4413 to evaluate vegetation changes. The data would then be used to assess progress toward achieving AMP objectives and to recommend adjustments in the grazing system or stocking rate. The intensity of monitoring studies will vary depending on resource objectives and management proposals.

If an evaluation supports an increase in livestock grazing use, the additional use would first be granted on a temporary basis. An evaluation of forage production must confirm the availability of additional forage before an increase in use would become permanent. Grazing management would be revised if the evaluation determines that the specific objectives established for the allotments are not being achieved. Other revisions may include changes in the amount of livestock use permitted, grazing system, period of use, or any combination of these. Prior to these changes, further environmental assessment would be completed.

Each operator would be issued term permits which specify allotment, period of use, and numbers and kind of livestock. Livestock grazing use would be supervised throughout the year. If unauthorized use should occur, action would be taken by BLM to eliminate it in accordance with regulations in 43 CFR 4150.

INTERRELATIONSHIPS

BLM Planning

The BLM planning system is essentially a decisionmaking process utilizing input from the public and data about the various resources. Land use objectives and rationale for each resource category are developed and incorporated into the proposed Management Framework Plan (MFP). Specific MFP recommendations relating to the grazing program, with some modification to reflect public input, were used as a basis for developing the proposed action and alternatives. The EIS scoping summary set forth in Appendix A more fully explains the relationship between the MFP alternatives and the EIS alternatives. The proposed MFP is available for review in the Burns District Office.

Federal Agencies

Grazing on lands administered by other Federal agencies is not contingent on grazing on BLM-administered lands. However, each portion is an integral part of the ranchers total operation. In the EIS area, 17 BLM operators also have grazing permits on the Malheur and/or Ochoco National Forests and 15 operators have grazing use on the Malheur National Wildlife Refuge. In addition to agencies which manage grazing on Federal lands, the Soil Conservation Service (SCS) develops plans for private ranches. Coordinated planning among the concerned Federal agencies and ranchers assures that resource conflicts are resolved and management goals are met.

State and Local Governments

The Intergovernmental Relations Division for the State of Oregon acts as a clearinghouse for the various State agencies. All BLM planning and major actions are coordinated through this State Clearinghouse. Planning is also coordinated with the county commissioners and/or the county planning commissions.

Under Oregon Senate Bill 100, all counties and cities in Oregon are required to develop and adopt comprehensive plans and land use controls consistent with statewide planning goals and guidelines developed by the Land Conservation and Development Commission (LCDC). Lake and Harney Counties have adopted comprehensive plans. The adopted plans are presently in review status by LCDC for compliance with Statewide goals. LCDC has required revisions to the plans and deferred acknowledgement until they are brought into compliance. The relationship of the proposed action and alternatives to LCDC goals is displayed in Table 1-5. The proposed action and all the alternatives are consistent with the adopted comprehensive plans and LCDC goals.

TABLE 1-5 Relationship of the Proposed Action and Alternatives to LCDC Goals [1]

LCDC Statewide Goal Number and Description	Discussion
1. To ensure citizen involvement in all phases of the planning process.	BLM's land-use planning is a process providing for public input at various stages. Public input was specifically requested in developing the proposed action and other alternatives described in the EIS. Public input will continue to be utilized in the environmental decision processes.
2. To establish a land-use process and policy framework as a basis for all decisions and actions.	The proposed action and other alternatives have been developed in accordance with the land-use planning process authorized by the Federal Land Policy and Management Act of 1976 which provides a policy framework for all decisions and actions.
5. To conserve open space and protect natural and scenic resources.	The Bureau planning system considered natural and scenic resources in the development of the proposed action and other alternatives. Fencing and vegetation manipulation projects in the proposed action and Alternatives 2 and 3 would impact open space as well as natural and scenic resources.
6. To maintain and improve the quality of the air, water and land resources.	The Federal and State minimum water quality standards would be maintained and/or improved under the proposed action and all alternatives. Prescribed burning and chemical herbicide application for brush control in the proposed action and Alternatives 2 and 3 would temporarily affect air quality.
8. To satisfy the recreational needs of the citizens of the State and visitors.	The BLM actively coordinates its outdoor recreation and land-use planning efforts with those of other agencies to establish integrated management objectives on a regional basis. Under the proposed action and all other alternatives, opportunities would be provided to meet recreational needs.
9. To diversify and improve the economy of the State.	The proposed action and Alternative 2 would induce economic gains in the long term due to increased forage production, resulting in improved local and State economy.

[1] Goals 3, 4, 7, 10, 11, 13 and 14 developed by the LCDC are not generally applicable to the proposed action or alternatives.

Chapter 2
Affected Environment

CHAPTER 2 AFFECTED ENVIRONMENT

INTRODUCTION

This section describes the resources within the Riley EIS area as they existed in 1980 (base year). The base year of 1980 was chosen because the primary data sources (Bureau planning system documents) were compiled during that year. The planning system documents consisting of Unit Resource Analysis, Planning Area Analysis and Management Framework Plans are available for review in the Burns District Office in Burns, Oregon.

Emphasis has been placed on those resource components most likely to be impacted if the proposed action or one of the alternatives were implemented. Analysis, including the scoping process, indicated that resource components such as minerals, timber, air quality and wilderness values would not be affected and, therefore, they are not discussed. No areas in the EIS area were identified as Wilderness Study Areas (see Glossary). The wilderness inventory and accompanying maps for Oregon (USDI, BLM 1980a) are available in the Burns District Office.

VEGETATION

The Riley EIS area has 21 distinct vegetation types which have been combined into the nine vegetation type groupings shown in Figure 2-1 and Table 2-1. Big sagebrush, low sagebrush and jumiper are the dominant vegetation types, covering approximately 95 percent of the area. Spot symbols on Figure 2-1 designate the approximate location of riparian vegetation communities and major playa-associated vegetation communities.

Table 2-2 summarizes forage condition for the EIS area. Range trend of the area has not been measured. Forage condition, as the term is used in this document, is based primarily on the percentage of desirable and intermediate forage species present in the plant community. The methodology for determining range condition is detailed in Appendix E. Appendix B, Table B-2, shows acres by condition class for each allotment in the EIS area.

Table 2-2 Forage Condition Summary

	Public Land Acres	Percent of EIS Area
Good	280,101	26
Fair	554,697	51
Poor	234,062	22
Unknown	12,280	1

Livestock forage production is that portion of the total vegetation production which is available and is suitable for sustainable use by livestock. Forage production is determined by climate, soil and species composition as well as past and present grazing use. Annual variation in timing and amount of precipitation results in large fluctuations in total forage production. Soil characteristics, primarily those which affect moisture-holding capacity, also are important influences on forage production. Composition of the plant community by desirable or determining production is described in Appendix C.

Residual ground cover expresses the amount of live vegetation, standing dead vegetation and litter which remains after grazing. Over time, the accumulation of this material provides protection for the soil surface and replaces soil nutrients. There is some decrease in live vegetative cover as forage condition declines in each vegetation type, but generally, as forage condition changes, one plant replaces another.

Table 2-1 Vegetation Types in the EIS Area

Vegetation Type	Public Land Acres	Percent of EIS Area	Common Plant Species[1]
Big Sagebrush	757,904	70.0	Big sagebrush, rabbitbrush, bluebunch wheatgrass, Idaho fescue, Sandberg bluegrass, cheatgrass
Juniper	135,282	12.6	Western juniper, big sagebrush, low sagebrush
Low Sagebrush	126,400	11.7	Low sagebrush, Sandberg bluegrass, Thurber's needlegrass
Greasewood	12,480	1.2	Greasewood
Seedings (Existing)	25,859	2.4	Crested wheatgrass
Desert Shrub	1,200	0.1	Shadscale, spiney hopsage,
Silver Sagebrush	11,920	1.1	Silver sagebrush, Nevada blue-grass, creeping wildrye
Ponderosa Pine[2]	9,591		Ponderosa pine, big sagebrush
Riparian	504	< 0.1	Willow, alder, aspen, wild rose, rushes, Kentucky bluegrass
Total	1,081,140	100.0	

[1] Scientific names for plants are listed in Appendix D.
[2] Not shown on Figure 2-1. Associated with juniper types along the U.S. Forest Service boundary.

There are no plants found in the EIS area presently listed as either threatened or endangered under authority of the Endangered Species Act. One plant species **(Stephanomeria malheurensis)** is proposed for endangered status. The only known population of the plant has been fenced in a 160 acre exclosure to protect it from grazing. The number of individual plants in the population has declined since protection was provided. Six plant species have either been found or are suspected to be in the EIS area that are under review by the U.S. Fish and Wildlife Service for possible listing as endangered or threatened status (45 FR 82480). Information concerning these plant species is found in Table 2-3. In addition, 22 plant species considered by BLM as sensitive occur in the EIS area. For further information on these species, see the Riley Unit Resource Analysis on file at the Burns District Office.

Streamside riparian vegetation occupies approximately 387 acres of public land. Neither ecological condition nor range condition has been inventoried on these areas; however, a riparian wildlife habitat inventory rated the condition of streamside riparian areas as follows: excellent (15 percent), good (36 percent), fair (15 percent), poor (28 percent), and unknown (6 percent). When relatively undisturbed, the vegetation along streams in the EIS area is generally composed of thick clusters of shrubs and trees interspersed with dense herbaceous vegetation. Fair and poor condition areas generally have fewer woody species (especially willow) than the excellent and good condition areas. With increasing disturbance, the dominant tree and shrub species are replaced by herbaceous species and the riparian area decreases in size.

Riparian vegetation associated with ponds and reservoirs occupies approximately 117 acres of public land. No inventory of the condition of these areas is available. In good condition, these areas are dominated by herbaceous species such as sedges, rushes and smart weed.

Interspersed with other vegetation types are herbaceous plant communities associated with playas. The annual production and species composition of these areas is highly variable depending upon the amount and timing of precipitation. Playas such as Foster Lake normally support herbaceous plants such as sedges, Nevada bluegrass, silver sagebush and annual forbs. Silver Lake, an alkali playa, supports alkali grass, salt grass and greasewood.

CLIMATE

The Riley EIS area has a semiarid climate, with long, cool, moist winters and short, warm, dry summers. The area has a winter precipitation pattern, with about half of the annual total occurring during the months of November through February. Much of this comes as snow, especially in December and January. Spring rains occur in May and June while the months of July, August and September are generally quite dry.

Precipitation tends to be elevation-dependent, ranging from less than 10 inches in the Harney Basin (4,000 feet elevation) to 20 inches in the foothills of the Blue Mountains (5,000-6,000 feet). Most of the

Table 2-3 Plant Species Under Review for Nomination for Threatened or Endangered Status [1]

Scientific Plant Species Name	Notice of Review Category [2]	Habitat Information	Allotments (Public land only)
Astragalus tegetaroides	2	Dry gravelly soils associated with ponderosa pine	None recorded
Draba douglasii var. crockeri	2	Low sagebrush sites	None recorded
Eriogonum cusickii	1	Barren, welded volcanic tuff	7023, 7024, 7019, 7081
Eriogonum prociduum	1	Unknown	None recorded
Nemaclatus rigidus	1	Somewhat gravelly, barren, dark soils	7088, 7001, 7023
Rorippa columbiae	2	Damp ground associated with riparian vegetation	7004
Stephanomeria malheurensis	E	Volcanic tuff-derived soils layered with a thin limestone deposit	Known to occur only in a 160-acre area which has been fenced to protect the plant from livestock (Allot. 7001)

[1] As published in "Endangered and Threatened Wildlife and Plants: Review of Plant Taxa for listing as Endangered or Threatend Species" Federal Register Vol. 45 No. 24 12/15/80.
[2] Category 1 = sufficient biological justification exists for listing as Endangered or Threatened status;
Category 2 = further study is needed to determine if biological justification for listing exists.
E Proposed endangered.
Categories are subject to change as new information becomes available.

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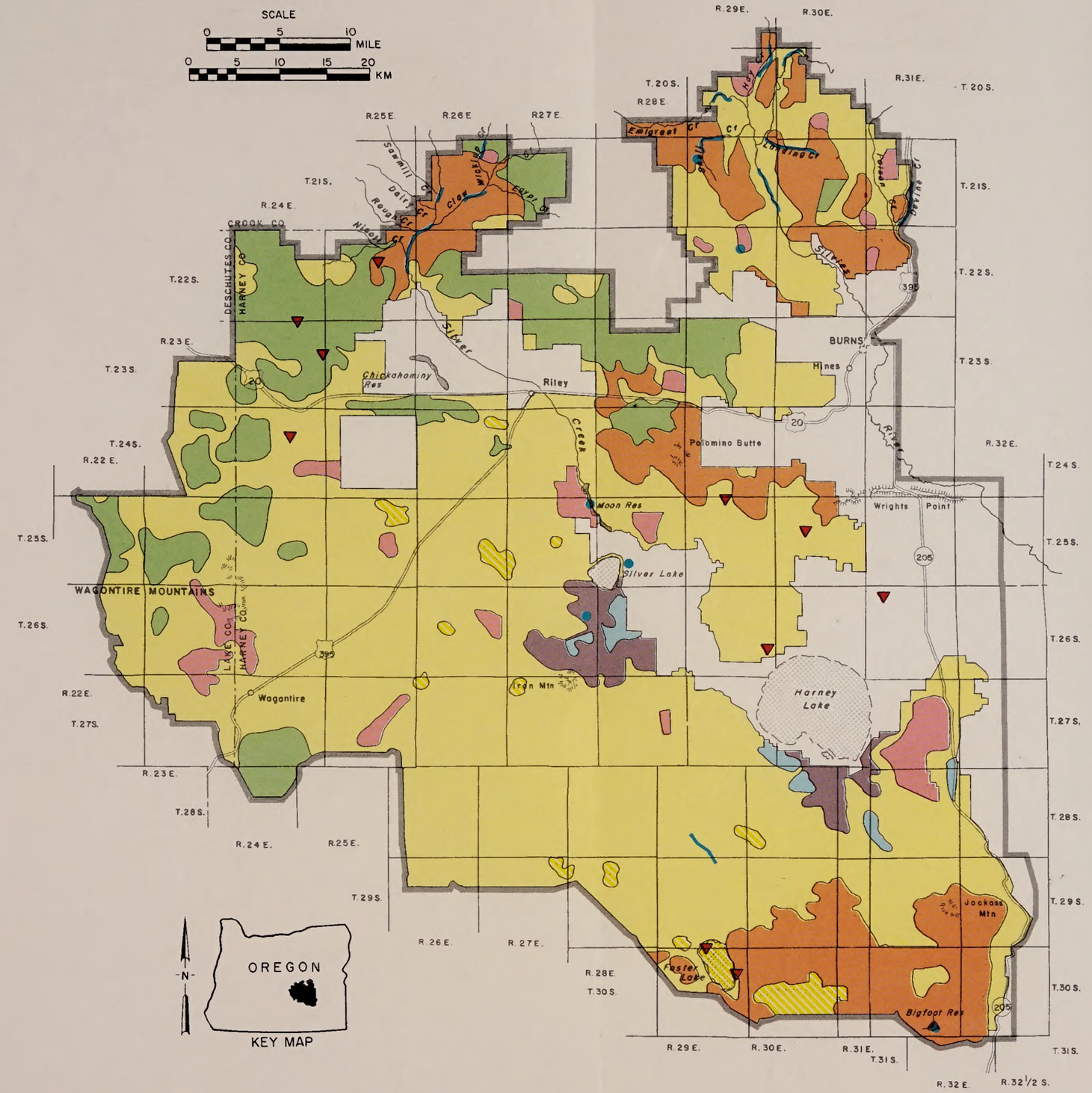

LEGEND

- Low Sagebrush
- Big Sagebrush
- Desert Shrub
- Greasewood
- Juniper
- Seedings (Existing)
- Silver Sagebrush
- Riparian
- Playa

FIGURE 2-1
VEGETATION TYPES

area receives 10 to 15 inches of precipitation annually.

Temperatures below zero occur nearly every winter, and summer temperatures over 100 F are not uncommon. Average frost-free days range from 111 days at Burns to 30 days in the higher elevations.

SOILS

Soils in the EIS area have been surveyed and described in Oregon's Long-Range Requirements for Water (Lindsay et al. 1969; Lovell et al. 1969; Norgren et al. 1969). A summary of the soil units and their properties appears as Appendix F. These soil units have been combined into four general divisions based on similar soil properties within two broad land types, Basin Land and Terraces (occurs on about 30 percent of the EIS area) and Uplands (70 percent).

The Basin Land and Terrace soils occur in the valley areas. The soils are mainly loamy to clayey in texture, deep and well drained. Sandy soils generally occur along the shorelines of old lakebeds in association with sand dunes. Sandy soils are susceptible to wind erosion.

The Upland soils are derived from volcanic rocks and are generally loamy to clayey, shallow and stony. Rock outcrops and very shallow and/or very stony soils generally occur in the higher elevations, are low in productivity and support sparser stands of vegetation than the deeper soils.

Erosion on upland areas is generally low. Streambank erosion is occurring along some streams including the Silvies River, and Hay, Cricket, Silver, Claw, Wickiup, Egypt, Sawmill, Rough and Nicoll Creeks.

WATER RESOURCES

Nearly the entire EIS area lies within the Oregon Closed Basin watershed, an extension of the Great Basin. The northwest corner of the area is in the Deschutes River drainage.

Water Quantity

Snowmelt in spring and early summer provides the major part of runoff for perennial streams. During the remainder of the year, groundwater and subsurface flow are the major contributors to streamflow. Most of the streams in the EIS area are intermittent. These flow only for brief periods as a result of snowmelt or rainfall in which the intensity exceeds the capability of the soil to absorb water (Branson et al. 1972).

Annual yields from the area usually range from 1 to 5 inches per acre, with most of the area yielding 1 to 2 inches per acre. The total annual yield from public lands averages 99,300 acre-feet per year (Pacific Northwest River Basins Commission 1970).

Water on public lands is used mainly by livestock, wildlife, wild horses and fish. The sources of water are streams, reservoirs, springs and wells. Over 90 percent of water on private land is used for irrigation.

Groundwater resources are found in alluvial deposits in valley areas and in volcanic rock materials. Studies made prior to 1970 indicated that groundwater withdrawal did not exceed the natural recharge in the watersheds (Pacific Northwest River Basins Commission 1970, Appendix V).

Water Quality

Groundwater quality is generally good; dissolved solids are usually less than 1,000 milligrams per liter (mg/l). Excessive sodium and boron cause problems in some places (Pacific Northwest River Basins Commission 1970).

According to the Oregon Department of Environmental Quality (ODEQ 1976), instream water quality is generally good except for low dissolved oxygen levels, and high water temperatures, pH and fecal coliform bacteria counts during the summer. These problems are mainly due to solar heating, often on diminishing flows and unshaded streams.

Sediment yields are generally low (.1 to .2 acre-feet per square mile per year). Stream bank erosion is probably the major contributor to sediment in streams.

WILDLIFE

Animals emphasized are those whose habitat or population would be significantly changed by the proposed action or alternatives. Data for mule deer, pronghorn antelope, water-associated birds, sage grouse and fish are summarized in Table 2-4. A complete species list of the Burns District with general habitat relationships is published in Wildlife of the Pacific Northwest (Guenther and Kucera 1978). Habitat inventories and a more detailed discussion of wildlife is available at the Burns District Office. Elk, mountain lion, bobcat, coyote and warm water fish (e.g. bass, catfish, etc.) are not discussed because populations are not expected to change significantly as a result of the proposed action or alternatives.

The American peregrine falcon is classified as endangered and the bald eagle is classified as threatened under the Endangered Species Act, 1973. Although, peregrines migrate through the EIS area, observations are rare and no active nests have been found. Bald eagles are often seen along Highway 20 west of Burns. Eagles are attracted to the area by migrating waterfowl, especially in February and March. No known nests or roosting sites are in the EIS area.

Table 2-4 Data on Wildlife in the EIS Area

Animal or Animal Groups	Habitat (Public Acres)			Population		
Mule Deer[1]	Winter Range	-	269,000	Winter	-	9,050
	Summer Range	-	224,000	Summer	-	4,660
Pronghorn Antelope [2]	Winter Range	-	170,000	Winter	-	2,650
	Summer Range	-	430,000	Summer	-	1,850
Water-Associated Birds	6,129 acres[3], 36 stream miles			No Data		
Sage Grouse	Strutting grounds and associated nesting areas	-	106,000	Low (See text)		
Fish	Habitat Condition	Stream Miles	Reservoir Acres	No data		
	Excellent	0	50			
	Good	5.9	226			
	Fair	.9	13			
	Poor	10.3	0			
		29.1	289			

[1] Summer and winter ranges overlap, the total deer range is 360,000 acres.
[2] Summer and winter ranges overlap, the total antelope range is 469,000 acres.
[3] Includes 504 riparian acres and 5,625 playa acres.

The western snowy plover is classified by the Oregon Department of Fish and Wildlife (ODFW) as threatened (ODFW 1977). Herman et al. (1981) counted 400 plovers at Harney Lake and 25 at Silver Lake. Populations appeared healthy (Ibid).

Due to its scarcity, water and associated riparian vegetation are very important to wildlife as sources of food and cover. Some 387 riparian acres occur along 36 public stream miles (Figure 2-1, Table 2-5). An additional 117 riparian acres are found at reservoirs and ponds. Upland meadows not along streams and riparian areas adjacent to isolated springs have neither been quantified in acres nor mapped. Consequently, these areas are not illustrated on Figure 2-1 or included in riparian acreages.

Table 2-5 Existing Condition of Riparian Habitat

Condition[1]	Riparian Acres	Riparian Stream Miles
Excellent	58	6.7
Good	139	16.0
Fair	59	2.4
Poor	108	8.3
Unknown	23	2.3
Riparian along streams	387	35.7
Riparian at reservoirs [2]	117	
Total riparian acres	504	

[1] Riparian inventory methodology shown in Appendix G.
[2] Condition class data unavailable.

Habitat diversity refers to the mixture or variety of land forms, vegetation and water. Interspersion of vegetation types provides habitat diversity. Sagebrush adjacent to grass seedings provides habitat diversity around the perimeter of the seeding (edge effect). A variety of plant species also increases habitat diversity. A seeding which also contains perennial forbs, shrubs and trees has higher habitat diversity than a seeding dominated by crested wheatgrass. Structure, or the physical aspects of vegetation, can provide habitat diversity. Some examples are clumps of high ungrazed grass and two age classes of willow along a stream.

Habitat diversity can be correlated with the range condition described in the vegetation section. Vegetation types with good range condition would have greater habitat diversity than similar areas in poor or fair condition. Seedings are an exception since they usually have low habitat diversity although they are usually rated in good range condition. Wildlife habitat in riparian areas rated as good has higher habitat diversity than areas rated poor. In general, the greatest numbers and kinds of wildlife are found in areas with the highest habitat diversity.

Fish

Approximately 80 percent of the 29 stream miles are in poor or fair condition (Table 2-4). Native fish in the EIS area include redband trout, minnows such as dace and redside shiners, bridgelip suckers and sculpins. Rainbow trout are planted to maintain the

sport fishery at four reservoirs and one stream in the EIS area. Because of limited range and declining habitat, the American Fisheries Society has recognized the Malheur sculpin and redband trout as being of "special concern" (Deacon et al. 1979). The introduction of rainbow trout has greatly reduced redband trout populations through interbreeding which results in loss of genetic purity. The Malheur sculpin is found in Silver Creek and its tributaries. Silted spawning gravel is probably limiting sculpin reproduction.

Water-Associated Birds

Approximately 80 species of birds use the riparian areas and playas during migration or for nesting. Some representative species are the Canada goose, whistling swan, cinnamon teal, gadwal, long-billed curlew, American avocet, Wilson's phalarope and spotted sandpiper. The majority of bird use occurs on the Malheur National Wildlife Refuge and adjacent private farmlands. In comparison with refuge and private lands, relatively little feeding and nesting habitat is found on public lands. Approximately 6,000 public acres of playas and riparian areas provide crucial nesting or feeding habitat (Figure 2-1). Important use areas on public lands are Silver Lake, Big Foot Reservoir, Seiloff Springs and numerous playa lakebeds. Playas are shallow lakebeds which are seasonally covered with water. Approximately 5,600 acres of these playas have significant use by water-associated birds. Livestock remove food and cover on some of these areas. Crested wheatgrass seedings adjacent to the Malheur Wildlife Refuge are important feeding areas for Canada geese.

Mule Deer

Deer are found primarily in areas illustrated on Figure 2-2. In 1980, populations were about 15 percent below ODFW objective levels for the EIS area (ODFW 1981, Polenz 1982). Public lands are used by about 9,000 deer during the winter when snow forces them out of higher elevations. Food and cover provided by winter habitat are especially important because the deer's fat reserves decrease during the winter. Winter ranges are the first areas to have green grasses in the spring. The spring growth of grasses on public lands provides forage needed by deer to improve their weakened condition.

About 4,700 deer summer on public lands, primarily in forested areas adjacent to the Malheur National Forest. Summer and early fall forage is important because it increases fat reserves needed to sustain deer through the winter. Riparian areas provide nutritious green forage late in the summer when upland vegetation has dried. Antelope bitterbrush is an important forage species for deer during the fall and early winter. Heavy livestock use of bitterbrush decreases food for deer on Allotment 7025.

Water developments have expanded deer use into areas previously unoccupied because of lack of water. Seedings and grazing systems have increased herbaceous forage and decreased food competition with livestock.

Pronghorn Antelope

In 1980, populations were about 10 percent below ODFW objective levels for the EIS area (Polenz 1982). During the summer, antelope are scattered throughout the EIS area. Antelope prefer low sagebrush flats with patches of big sagebrush. Severe winter weather concentrates antelope at lower elevations which are usually free from snow.

Competition for forage with cattle and wild horses is slight due to different forage preferences (Vavera and Sneva 1978). However, lack of water can be a serious problem during drought years.

Most BLM fences allow freedom of movement by having the bottom wire a minimum of 16 inches from the ground. Seedings and wildfire have converted dense stands of big sagebrush to low growing herbaceous vegetation which is preferred by antelope. Water developments have expanded antelope use.

Other Mammals, Upland Game Birds, Other Birds, Amphibians and Reptiles

Approximately 254 of these species inhabit the EIS area. Representative species include the black-tailed jackrabbit, beaver, ravens, golden eagle, western rattlesnake and spotted frog. Some species such as the beaver are found in specific habitat types; others, such as the deer mouse, are widespread over the EIS area. Highest species diversity occurs in riparian areas.

Sage grouse are found throughout the EIS area primarily in the low sagebrush type (Figure 2-1). Hunting has not been allowed in Oregon since 1975 because of low populations. Thirty strutting grounds have been located (Figure 2-2). Additional strutting grounds are suspected to exist. Strutting grounds and nesting areas are crucial habitat because grouse mate each year in these natural clearings in the sagebrush. Most nesting occurs within 2 miles of a strutting ground. Sagebrush, besides being important as food, provides the necessary escape and nesting cover. In Nevada, upland meadows and meadows along streams are crucial habitat because they supply insects and succulent forbs to young birds (Savage 1969). In the EIS area playas and low sage sites provide insects and forbs because there are few meadows in sage grouse habitat.

WILD HORSES AND BURROS

All unbranded and unclaimed horses and burros in the EIS area, as of December 15, 1971, are considered wild and free roaming as defined in the Wild Horse and Burro Act (Public Law 92-195). Two herd management areas, as displayed in Table 2-6, currently contain the wild horses in the EIS area. Burros are found in the Warm Springs herd management area.

Presently, there are approximately 128 miles of existing interior fences within the herd management areas, of which about 82 miles exclude wild horses from private lands or seedings. These fences generally do not cause injuries because the horses have become accustomed to fence locations. See the Wild Horse Herd Management Plans on file at the Burns District Office for additional information concerning the wild horses and burros in the EIS area.

RECREATION

Chickahominy Reservoir is the only developed recreation site on public land in the EIS area. In 1979, the site received over 13,000 visitor days (see Glossary) of recreational use. A number of other primitive sites offer opportunities for camping and picnicking.

A number of areas attract botanic, geologic, zoologic, scenic, archeologic, historic and/or cultural sightseeing use. Examples of high quality sightseeing opportunities include Wright's Point, Palomino Butte and Sagehen Hill.

Hunting opportunities exist for big game, upland game and other species. Generally, high quality hunting opportunities occur for antelope south of Highway 20, and for deer north of Highway 20.

Fishing opportunities are available for cold and warm water species in reservoirs, streams and creeks. Chickahominy Reservoir offers high quality fishing opportunities. High quality opportunities also exist for rock collecting (Glass Butte) and riding off-road vehicles (Radar Hill).

Table 2-7 shows the estimated current recreational visitor use for the EIS area. Of the total visitor use in Harney County, about 12 percent is attributable to public land in the Riley EIS area.

Table 2-7 Estimated Recreational Visitation to the Riley EIS Area

Recreational Activity	1978-79 Visitation Visitor Days/Year Total (Harney County)	Public lands within EIS Area
Hunting		
Big Game	74,300	7,600
Small Game	12,200	1,140
Fishing	61,630	18,020
Camping	304,700	42,910
General Sightseeing [1]	113,440	38,810
Other Day Use [2]	402,600	10,770
Total	973,870	119,250

[1] Derived from 1979 average daily traffic counts along main travel routes adjacent to public land.
[2] Total area day use visitation excludes urban and semi-urban activities not generally associated with range lands administered by the BLM.

CULTURAL RESOURCES

BLM is required by law and executive order to identify, protect and enhance significant cultural resources on public lands. A number of procedures, including those specified in 36 CFR 800.4(a), were used to identify the cultural resources within the Riley EIS area.

The BLM has a cultural resource inventory composed of three classes of inventory (BLM Manual 8111). A survey of existing cultural resource information (Class I inventory) has been completed for the area (Bright 1979) through a compilation of the area's existing site record data.

Class II field sampling inventories have been undertaken on 29,095 acres to provide a data base for making an objective estimate of the nature and distribution of sites within the study area. These inventories are consistent with requirements of the Programmatic Memorandum of Agreement between the BLM, Advisory Council on Historic Preservation and National Conference of State Historic Preservation Officers, dated January 14, 1980.

Table 2-6 Wild Horse Herd Management Areas

Herd Management Area	Horses Counted 1980	Acres Public Land	Allotments Involved	Condition of the Horses
Palomino Buttes	74	70,049	7019,7021	Good, reproductive
Warm Springs [1]	458	456,855	7001,7002	Good, reproductive[2]

[1] Horses counted in 1979; there was no 1980 count. There were also nine burros counted in 1979. In January 1982, 54 horses were gathered.
[2] The burros, while in good physical condition, do not seem to be reproducing. The reason for this is unknown.

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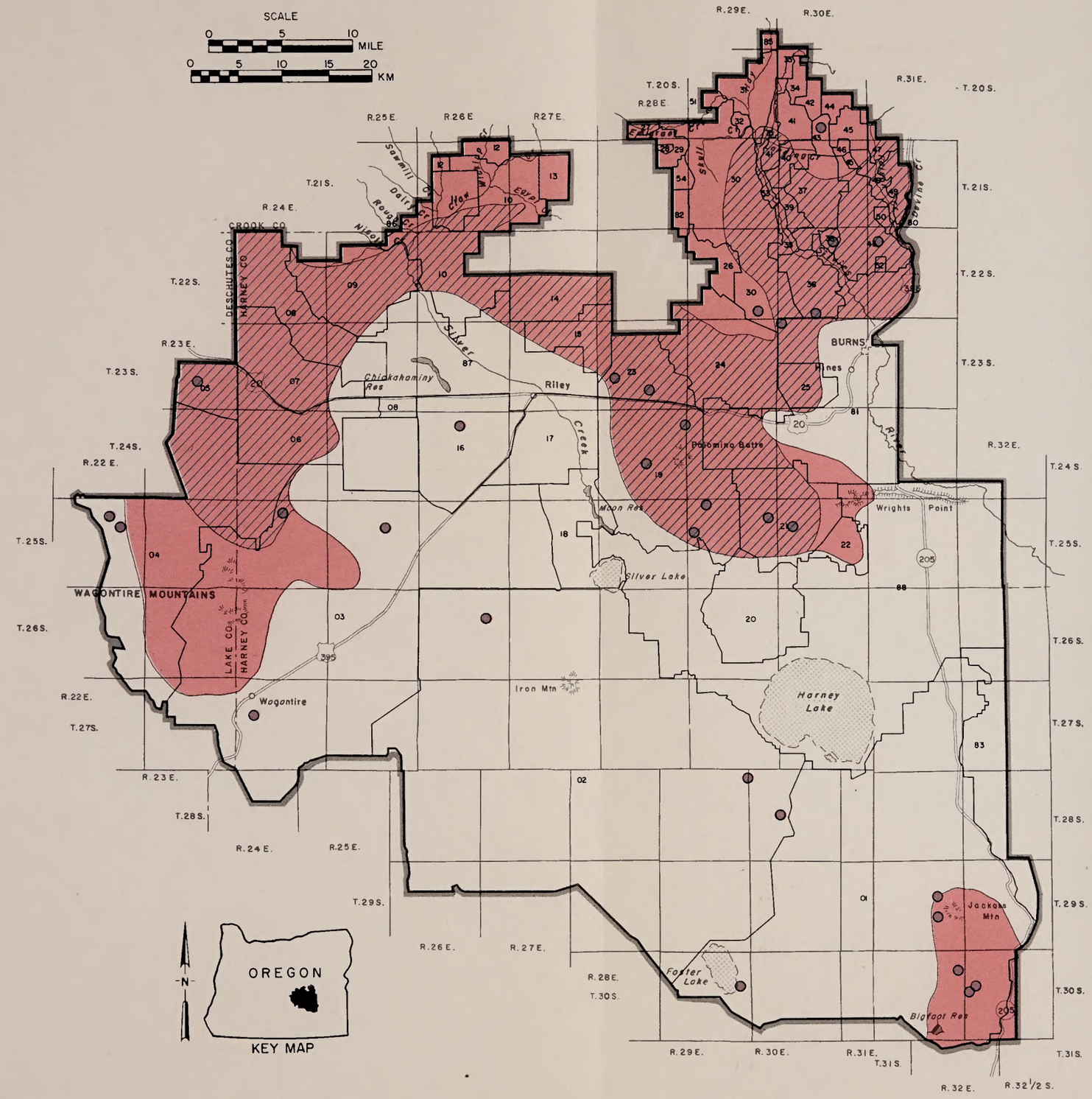

LEGEND

- Deer Habitat
- Deer Winter Range
- Sage Grouse Strutting Grounds

Allotment Numbers and Names

7001 East Warm Springs	7032 Hotchkiss
7002 West Warm Springs	7033 Silvies River
7003 East Wagontire	7034 Scat Field
7004 West Wagontire	7035 Silvies Meadow
7005 Glass Butte	7036 Hayes
7006 Rimrock Lake	7037 Coal Pit Springs
7007 Hat Butte	7038 Curry Gordon
7008 Sheep Lake - Shields	7039 Cave Gulch
7009 Dry Lake	7040 Landing Creek
7010 Claw Creek	7041 East Silvies
7011 Upper Valley	7042 Dole Smith
7012 Pack Saddle	7043 Lone Pine
7013 Zoglmann	7044 Cowing
7014 Badger Spring	7045 Whiting
7015 Second Flat	7046 Baker Hill Field
7016 Juniper Ridge	7047 Pea Body
7017 Cluster	7048 Varien Canyon
7018 Silver Lake	7049 Forks of Poison Creek
7019 Palomino Buttes	7050 Clemens
7020 Sand Hollow	7051 Sawtooth MNF
7021 Weaver Lake	7052 Lone Pine Field
7022 Dog Mountain	7053 Silvies Canyon
7023 West Sagehen	7054 Cricket Creek
7024 East Sagehen	7080 Devine Canyon
7025 Gouldin	7081 Harney Basin
7026 Horton Mill	7082 Hines Field
7027 Emigrant Creek	7083 Malheur Refuge
7028 Stinger Creek	7085 Rainbow Creek
7029 Spring Creek	7086 Rough Creek
7030 Skull Creek	7087 Silver Creek Valley
7031 Hay Creek	7088 Sunset Valley

——— Allotment Boundary

NOTE: Map numbers refer to last two digits of allotment numbers. Allotments 7080 thru 7088, inclusive, are unalloted status.

FIGURE 2-2
WILDLIFE HABITAT

Class III intensive field inventories are undertaken prior to BLM actions which would result in ground disturbance or land ownership changes. The objective of a Class III inventory is to identify and record all observable cultural resource sites within a specified area. Class III intensive field inventories have been performed on 5,785 acres within the EIS area. The results of these intensive inventories are documented in each site specific environmental assessment.

No sites on public land in the EIS area are currently on the National Register of Historic Places. The criteria used to assess the eligibility of identified cultural resources for inclusion in the National Register are described in 36 CFR 1202.6. Further, the BLM employs a cultural resource evaluation system to assess the relative value of a cultural site in terms of possible uses.

While little of the area has been thoroughly surveyed, 130 archeologic sites and numerous isolated finds have been documented as being on or near public land within the EIS area. Of the total 130 sites, about 90 percent are open, surface sites. About one third of these are lithic scatters, containing no intentionally shaped artifacts.

There are 32 inventoried historic sites on or near BLM-administered land within the area. Of these, many are documented in historical records but remain unverified in the field.

Paleontologic sites which include vertebrate and certain invertebrate fossils are protected within the scope of the Antiquities Act. While the EIS area has not been thoroughly surveyed, certain fossils are known to exist. Most sites are on private land, and there are few data dealing with site locations, significance and conditions. None of the reported paleontologic sites are scientifically unique.

VISUAL RESOURCES

Visual resources are the land, water, vegetation, animals and the other features (as described in this chapter) that are visible on public lands. Visual resource management (VRM) objectives have been developed based on an inventory and evaluation of scenic quality, visual sensitivity and distance zone (see Glossary). Examples of highly scenic areas on public land include Cricket Creek, Silver Creek, Devine Canyon, Emigrant Canyon, Jackass Ridge and the viewshed seen from Highway 205 north of French Glen. Lands highly sensitive to landscape modification are those easily seen from the major highways in the EIS area.

VRM classes specify management objectives and allow for differing degrees of modification. Objectives for each VRM class follow:

Class I: This class provides primarily for natural ecological change. It is applied to primitive areas, some natural areas and other similar situations where management activities are to be restricted. There are no Class I public lands in the EIS area.

Class II: Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape. A change may be seen but should not attract attention. This generally includes areas with high to moderate scenic qualities and high sensitivity levels. About 11 percent of the public lands in the EIS area are in this class.

Class III: Changes in any of the basic elements caused by management activity may be evident in, but should remain subordinate to, the existing characteristic landscape. This generally includes areas with moderate to low scenic qualities and high to medium sensitivity levels. About 28 percent of public lands in the EIS area are in VRM Class III.

Class IV: Changes may attract attention and be dominant landscape features but should reflect those basic elements inherent in the characteristic landscape. This generally includes areas with low scenic quality and medium to low sensitivity levels. VRM Class IV incorporates approximately 61 percent of the public lands in the EIS area.

VRM class delineations for the Riley EIS area are available in the Burns District Office.

SPECIAL AREAS

Areas of Critical Environmental Concern (ACECs) are areas on the public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards (FLPMA Section 103(a)). Designation of an area as an ACEC does not necessarily preclude development but rather ensures the protection of sensitive values in those cases where appropriate development may take place. Prior to designation, site specific management prescriptions are developed for each potential ACEC.

Two areas were nominated for ACEC consideration during the District's planning process (see Table 2-8). One (South Narrows) has potential for designation. Designation of this area as an ACEC, if considered appropriate, will be part of the Management Framework Plan decisions for the area.

One 640-acre area along Silver Creek, Section 8, has been proposed for Research Natural Area (see Glossary) designation. The area contains a stream system originating in ponderosa pine type vegetation and includes big sagebrush/bluebunch wheatgrass and low sagebrush/Idaho fescue vegetation areas. A diversity of plant and animal species is found in the area.

Table 2-8 Nominated and Potential Areas of Critical Environmental Concern

Site Name	Approximate Size (acres)	Description	Primary Resource Values
POTENTIAL ACEC			
1. South Narrows	160	Only known site of Malheur wirelettuce, a plant under review for Federal listing (see Table 2-3)	Botanic
NOMINATED BUT NOT QUALIFIED FOR ACEC DESIGNATION [1]			
1. Virginia Creek	800	Plant under review for Federal listing	Botanic

[1] The identification criteria (relevance and importance) derived from the Federal Land Policy and Management Act (1976) were applied to evaluate all areas nominated for ACEC designation. The area nominated but not qualified for designation failed to meet the criteria of importance, as described in the August 1980 Final Guidelines for Areas of Critical Environmental Concern (USDI, BLM 1980b).

SOCIOECONOMIC CONDITIONS

The area is defined for socioeconomic purposes as Harney County. The lands involved lie in the northern part of the county where most of the population lives.

Population and Income

The population of Harney County in 1981 was estimated to be 8,000 persons. The population had reached 8,314 persons in 1980. Population growth during the past two decades was moderate, averaging 0.7 percent per year during the 1960's and 1.4 percent per year in the 1970's. The decline in 1981 amounted to a 3.8 percent decrease.

Personal income in 1979 was $69.4 million. Income per capita was $8,372 as compared with a state-wide average of $8,887. The portion of income attributable to the work force, labor and proprietors' income, amounted to $55.2 million of which $11.2 million was farm income and $44.0 million was non-farm income.

Farm proprietors' income varies widely from year to year as shown by the figures for Harney County since 1974:

1974	$2,431,000
1975	475,000
1976	2,471,000
1977	2,590,000
1978	4,104,000
1979	7,756,000

Economic Activity

The labor force--people working or looking for work--averaged 3,670 in 1981, a decline from 4,030 in 1980 due primarily to the closure of a large lumber mill. Unemployment averaged 21.9 percent of the labor force in 1981. The industrial composition of non-agricultural wage and salary employment in 1980 is shown in Table 2-9.

Table 2-9 Non-Agricultural Wage and Salary Employment, 1980 (Average number of workers)

Industry	Employment	Percent
Lumber and wood products	340	15.0
Other manufacturing	10	0.4
Construction	160	7.0
Trade	520	22.9
Government	830	36.6
Other	410	18.1
Total	2,270	100.0

Source: Oregon Department of Human Resources, 1981

Data on farm (and ranch) employment is not available for 1980, but in 1979 there were 360 farm/ranch proprietors and an average of 304 farm wage and salary workers employed (U.S. Department of Commerce, 1981).

The value of agricultural production in 1980 was $23.5 million including $5.0 million in crops sold and $18.5 million in livestock and livestock products. There were 110,000 cattle and calves in the county on January 1, 1980. The value of cattle and calves sold was $18.0 million. (OSU Extension Service, 1981).

The business of livestock production creates additional local sales activity through the purchases by ranchers and their suppliers. A portion of these gross sales are earned by individuals as personal income. Estimates of the relationships of ranchers' sales to total gross sales and to personal income

generated have been obtained from inter-industry models for these counties developed by the Forest Service for the year 1977 (USDA, FS 1982). Applying these estimates to 1980 livestock sales figures, the total gross sales generated locally by livestock producers in 1980, was $35.5 million. Local personal income generated by the gross sales was $11.3 million.

Economic Significance of Public Land Resources

The following sections describe several measures of the value of grazing privileges to the livestock industry, and estimate the amount of local income and employment generated by the existing level of activities arising from public land use.

Dependence of Livestock Operators on Public Forage

During the 1980 grazing year (3/1/80-2/28/81), 52 operators held grazing privileges on public lands. Their active preference (see Glossary) totaled 73,494 AUMs, and their actual (paid) use in 1980 was 57,975 AUMs. They reported total herds of 23,120 cattle. Assuming 12 AUMs forage for each animal per year, actual use of BLM forage provided 21 percent of total forage requirements. The use of BLM forage is heaviest during the spring and summer, and it comprises a major part of forage requirements in that season for most operators. Some operators do not have any feasible alternative source of forage during that period. Table 2-10 shows the average annual dependency (BLM forage as a percentage of total needs), and the distribution of operators by peak level of dependence. While the average operator is reliant on BLM forage for about 57 percent of his needs during his heaviest period of use, some operators are dependent on BLM forage for 90 percent or more of their needs for a period of a month or more during the grazing year as shown in the table.

BLM Grazing Licenses and Ranch Property Values

The Bureau of Land Management does not treat grazing permits as vested property rights; however, effects on private asset valuation may occur. Based on BLM file data and contract appraisal studies, the asset value of public forage is estimated to be about $40-$45 per AUM. Estimates of the capitalization values placed on grazing permits associated with ranch properties when sold have varied widely from this estimate. A study of ranch sales in Grant and Umatilla Counties found no statistically valid evidence that public grazing use affected ranch sale values (Winter 1979). However, grazing preferences have sold at prices ranging from $22 to $55 per AUM in southern Idaho according to the Owyhee Grazing Management FEIS (USDI, BLM 1980c), and an average price of $65 per AUM was indicated in interviews with parties to the sale of several ranch properties in eastern Oregon during the years 1977 to 1979 (USDI, BLM 1980d).

Table 2-10 Operator Dependence on BLM Forage, By Herd Size Class [1] (Dependence based on paid use, 1980 grazing year)

Item	Herd Size Class				
	Under 100	100-399	400-999	1,000+	Total [3]
Operators	6	24	14	8	52
Cattle [2]	226	5,125	8,108	9,661	23,120
Active Preference (AUMs)	888	15,269	29,273	28,063	73,494
Actual Use (AUMs)	444	11,392	26,616[4]	19,523	57,975[4]
Average dependence [5]	16.4%	18.5%	25.9%	16.8%	20.4%
Number of operators by highest monthly dependence [6]:					
Under 50 percent	3	7	2	5	17
50-59 percent	-	4	2	-	6
60-69 percent	1	-	4	2	7
70-79 percent	-	4	1	-	5
80-89 percent	1	2	2	-	5
Over 90 percent	1	7	3	1	12
Total	6	24	14	8	52

[1]Data pertains to livestock operators holding grazing permits within the EIS area. Forage on National Forest and State lands is not covered.
[2]Includes horses.
[3]Includes 6 operators with a total of 1,731 cattle who had no use in 1980.
[4]Use of 1,397 AUMs was deducted from these figures for computational purposes to adjust use of one operator using BLM forage in alternate years.
[5]Actual use of BLM forage during 1980 as percent of annual forage requirements. Computed by dividing actual use for a herd size group by the total forage requirements for the class (12 times the number of cattle involved), and converting to percentage terms.
[6]Actual use of BLM forage as percent of total needs during month of greatest BLM forage use.

Financial Viability of Ranch Enterprises

Return above cash costs is a guide to the effect of changes in public grazing on ranch operations. Ranch budget information on income and expenses (presented in Appendix I) is used to develop estimates of "return above cash costs" for several ranch herd size classes. Return above cash cost is the amount of money available after payment of cash costs (See Appendix I) to cover the support of the rancher's household, replacement of capital equipment (depreciation), and repayment of interest and principal on intermediate or long-term loans.

Return above cash costs for the average ranch in each herd size class based on 1978-80 beef prices and 1980 levels of BLM forage use was as follows:

Under 100 cows	-	$ 4,809
100 - 399 cows	-	23,964
400 - 999 cows	-	79,062
1,000 or more cows	-	196,277

A representative ranch with less than 100 cows, for example, is estimated to have about $4,809 left out of the average year's receipts to cover household expenses, depreciation and long-term debt.

Local Income and Employment Effects

Livestock sales of BLM permittees averaged about $6.4 million during the 1978-80 period according to the ranch budget survey. This estimate represents price conditions during a period which included the high beef price years 1978 and 1979.

Local personal income derived from these sales accounted for $6.1 million, or 8.8 percent of personal income in the EIS area. The portion of their forage derived from public lands was responsible for about 1.8 percent of personal income in the area. Employment in livestock and other local industries, attributable to grazing public lands, is about 125 workers.

Other Land Use Activities

Apart from livestock grazing, other land uses include timber harvest, mineral exploration and quarrying, and wildlife trapping, all of which provide minor amounts of local income and employment. Hunting and fishing, camping, and general recreational use on BLM lands in the Riley EIS area generate local employment roughly estimated at about 100 jobs, however, it has not been determined that these activities will be affected by the alternatives considered in this document.

Payments to Harney County derived from lands managed by BLM amounted to $634,164 in fiscal 1981. These payments are principally payments in lieu of taxes and mineral fees which would not be affected by the alternatives considered.

Social Conditions

Social conditions which might be affected by any of the alternatives are primarily those relating to the residents of Harney County. Groups interested in these public lands include the ranching industry, the timber industry, the mining industry, conservation groups, wild horse groups, historical groups, archeological groups, hunting and fishing groups, other recreation-oriented groups and local resident groups.

The group most likely to be affected is the ranching industry. The ranchers style of life is tied to the land and to the ranch operation.

Chapter 3
Environmental Consequences

CHAPTER 3 ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

Throughout this chapter, environmental consequences (impacts) are compared to the existing situation, as described in Chapter 2.

The significant impacts resulting from implementation of the proposed action and each of the alternatives are analyzed in this section. If a resource is not affected or if the impacts are considered insignificant, no discussion is included. Analysis, including the scoping process, indicates that there would be no significant impacts upon air quality, minerals, climate, energy consumption or wilderness.

The major actions which cause impacts are allocation of existing and future forage production, implementation of grazing systems, change in period of use and installation of range improvement projects. No change is expected from the existing situation on the unalloted areas (11,867 acres); therefore, these areas are not discussed further.

The following criteria were used to determine the nature and extent of impacts identified:

Beneficial impact: Resource conditions would improve relative to the existing situation.

Adverse impact: Resource conditions would deteriorate relative to the existing situation.

No impact: Resource conditions would remain the same as the existing situation.

Short term: The 10-year period needed to complete the range improvement projects and implement grazing systems.

Long term: Fifteen years after implementation of the proposed action or alternative (10 years for implementation plus 15 additional years).

The following assumptions have been made as a basis for the impact analysis:

- The proposed action or any alternative selected would be fully implemented as described in Chapter 1.
- Monitoring studies would be completed as indicated and adjustments made as needed.
- Grazing systems would be followed.
- The principal resource directly impacted would be vegetation. Any changes in production, condition and trend of vegetation would affect other resources.
- Personnel and funds would be provided to implement the proposed action or any alternative within the stated timeframe.
- Standard procedures and design elements would be effectively carried out for construction of range improvement projects in the proposal or any alternative.
- Regular maintenance would be carried out to maintain the functional capability of all range improvements.

IMPACTS ON VEGETATION

Each component of the proposed action and the alternatives is expected to have an impact on the vigor and reproduction of the key species (Table 1-4). Actions which enhance a species' vigor and reproduction cause an increase in the number and size of that species in a plant community. Conversely, if the action adversely affects a plant's vigor and reproduction, the species affected will decrease in number and size in the plant community. (Throughout this section, this occurrence will be referred to as increase or decrease in composition.) For purposes of analysis, it is assumed that available nutrients, primarily water, are now essentially fully utilized by the present vegetation. Consequently, any increase in the amount of the key species would result in a similar but opposite change in the amount of some other herbaceous species. However, no significant reduction of woody species is expected. A decrease in key grass species would result in an increase in woody species such as sagebrush and herbaceous species such as cheatgrass.

Changes in other vegetative characteristics such as forage production, forage condition, residual ground cover, as well as riparian vegetation and threatened or endangered plants, are dependent upon composition changes. The discussion of general changes in composition expected from each component of the proposed action and each alternative will precede the analysis of impacts to the above characteristics. A summary of the long-term impacts to vegetation is shown in Table 3-1. Impacts to trend have not been predicted.

Impacts to the nine vegetation groupings will not be discussed separately by group because the plants most affected by the proposed action and the alternatives are found in almost every vegetation

Table 3-1 Long-Term Vegetation Impacts

Vegetative Characteristic	Existing Situation	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Livestock
Forage Condition (Acres)					
Good	280,298	372,204	324,166	396,251	340,430
Fair	554,779	532,794	425,494	532,990	520,885
Poor	234,170	164,249	319,587	140,006	207,932
No Data [1]	11,893	11,893	11,893	11,893	11,893
Total Residual Ground Cover (Acres)					
Increasing	No Data	1,182	0	598	9,707
Static	No Data	298,857	298,857	298,284	817,591
Decreasing	No Data	781,101	782,283	782,258	253,842
Long Term Forage Production (AUMs)	78,865	99,856	78,865	106,061	90,359
Streamside Riparian **Vegetation [2] (Acres)**					
Increasing	No Data	164	18	77	331
Static	No Data	223	262	278	156
Decreasing	No Data	0	107	32	0

[1] Acreage classified no data includes surface water and unalloted areas.
[2] Species composition of key woody riparian species only.

type. Consequently, the expected changes in key species would occur in nearly every vegetation type although in somewhat different proportions depending upon the present composition and potential of the site and the actions being proposed.

Vegetation Composition

The following analysis identifies the general changes in composition of the key species that are expected to result from the component of the proposed action and each alternative. (See Table 1-1 for components by alternative.) Since significant composition changes usually take several years, the following analysis is confined to a discussion of long-term impacts.

Estimates of changes in composition of desirable species were based upon observations by district personnel, professional judgment, analysis of similar systems elsewhere and cited studies.

Vegetation Allocation and Grazing Systems

The vegetation allocation (Appendix B, Tables B-1 and B-4) and the grazing systems in the proposed action and the alternatives determine the degree and timing of utilization of the key species. No change in the current species composition would occur on areas managed under fenced Federal range or unallotted status.

The vegetation allocation for the proposed action and Alternatives 1 and 2 would initially allow livestock use at a level about 27 percent higher than the 1980 actual use level (57,975). Although Alternative 3 would have an overall decrease of about 5 percent, 27 allotments would have the 1980 actual use level. Under all the alternatives, initial levels of livestock use would be within the estimated current grazing capacity.

Under the proposed action and Alternatives 2 and 3, allotments with initial increases in the amount of grazing use would include grazing systems designed to provide varying amounts of rest during the key species' critical part of the growing season. The critical part of the growing season for the species shown in Table 1-4 is normally May 1 to July 15. It begins six weeks prior to peak of flowering during an average year. This is the period in which the plants are drawing stored carbohydrates to develop flower stalks and vegetative growth. Carbohydrate reserves are replenished during the period of growth prior to seedripe. The critical period of growth ends when the plant has replenished its carbohydrate reserves and has produced seed. Removal of foliage during the period of critical growth results in reduced vigor which is evidenced by fewer seedstalks, lower vegetative production, and a smaller crown size. In the following discussion, each proposed grazing system is evaluated for its ability to allow plants to complete the critical stages of growth. Grazing system abreviations are indicated in parentheses to allow cross referencing to Appendix B, Table B-2.

Spring Grazing System (EA)

The spring grazing system results in the removal of previous years growth together with 20 to 30 percent of the current year's growth primarily on perennial grasses. Grazing during this period requires the plants to draw heavily on carbohydrate reserves in order to replace the grazed portions. However, since grazing ceases while adequate soil moisture is available, most plants are able to reach full growth, produce seed and replenish carbohydrate reserves.

This system would enhance the production of perennial grasses since reproduction of a large number of viable seed is dependent upon vigorous mature plants (Hanson 1940). Seedling establishment would depend upon the intensity of grazing in the spring following germination. If seedling plants are not physically damaged through trampling or being pulled up, they would normally be established by the start of the third growing season (Stoddart, Smith and Box 1975, p. 483). The spring grazing system results in little or no utilization of woody species since grass species are more palatable to cattle at this time of year. In Allotment 7052, this system has resulted in stands of bitterbrush in excellent condition.

Spring/Summer Grazing System

Grazing would occur every year during the critical part of the growing season under the spring/summer grazing system. Some researchers (Laycock, 1981) indicate that perennial grasses can maintain vigor under such a system if the distribution of grazing is uniform, the condition of the range is fair to good, and the intensity of utilization is light or moderate. Other studies (Cook, 1971) indicate that even moderate levels of utilization may be too severe for a spring/summer grazing system. All researchers agree however, that heavy use levels under a spring/summer system results in lowered vigor of the palatable plants.

Although the proposed stocking rates would achieve a moderate level of utilization on most areas, factors such as terrain, location of fences and water, type of livestock and the type of vegetation would often result in heavy grazing of some portions of an allotment and light use in other areas. A decrease in key species composition is expected on those areas within an allotment which receive heavy utilization -- primarily areas adjacent to water developments, riparian areas and valley bottoms. Spring/summer grazing at the Squaw Butte Experiment Station (which is located 40 miles west of Burns) resulted in heavy utilization of 37 percent of the range. Over an 11 year period, this produced a change in species composition toward dominance by bunchgrasses such as Sandberg's bluegrass (Hyder, 1981).

Deferred Grazing System (DF)

The deferred system would allow grazing after most of the herbaceous key species have reached seedripe stage and replenished carbohydrate reserves. The composition of desirable herbaceous species such as Idaho fescue and bluebunch wheatgrass would increase and the composition of shrubs would decrease. Utilization of shrubs would be higher than under other grazing systems. Moderate utilization (60 percent) of shrubs encourages growth of additional twigs and therefore increases forage production. Reproductive capacity, on the other hand, is decreased over the years, since increased twig growth reduces the development of flowers and fruits (Garrison 1953 *Cited by* Stoddart, Smith and Box 1975, p. 135). Where woody key species are found in limited numbers, some individual shrubs would be selected by cattle and heavily browsed, resulting in reduced vigor of these plants. The critical growth period for woody species occurs in late summer. Livestock normally concentrate in riparian areas under deferred grazing. However, livestock use of the riparian areas under deferred grazing is expected to be light or moderate in several areas due to factors such as inaccessibility (e.g., silvies Creek) and a dense shrub cover.

Deferred Rotation Grazing System

Under the annual deferred rotation grazing system (DR1), 1 year of grazing use during the entire critical growing period would be alternated with a year of grazing during early spring and late summer/fall in successive years. The early spring grazing would end early enough to give most herbaceous key species an opportunity to replenish carbohydrate reserves and maintain vigor. The late summer grazing would occur after carbohydrate reserves of the key species have been stored. As a result, the vigor of the key species would be maintained at an acceptable level. Under the biannual rotation (DR2), 2 years of rest during the critical part of the growing season would allow plants to recover vigor following 2 years of season-long grazing. Improved vigor as demonstrated by significantly greater yields of perennial grasses resulted after 2 years of spring/summer rest (Martin, 1973 as cited in Stoddart, Smith and Box 1975). Although both deferred rotation systems would improve the vigor of existing plants the key species composition is not expected to change significantly enough to result in a higher forage condition class rating.

Reproduction of woody key species would not be improved in upland areas because the sequence of grazing treatments does not provide sufficient protection from grazing to allow seed production and seedling establishment. Streamside riparian vegetation located within the areas proposed for deferred rotation grazing are generally in good or fair condition and would remain so. Skull Creek, however, is currently in poor condition and would

continue in poor condition because young willow shoots would be grazed every year under this grazing system.

Rest Rotation Grazing System

Rest rotation grazing results in moderate (60 percent) utilization of key species in the use pasture. Most of the use occurs during the growing season. Approximately 25 to 33 percent of the area is completely rested from grazing each year. The need for periodic complete rest from grazing arises from the fact that even at proper stocking rates, continuous grazing usually results in utilization of the most palatable plants beyond the proper use level. Otherwise, the heaviest use usually occurs on the most accessible areas resulting in a decline in the key species composition. Hormay (1970) states that these species can be maintained by periodically resting the range from use by means of rest rotation grazing systems. Rest periods allow the plants to complete the stages of vegetative growth, seed production and food storage. In addition, it provides for seedling establishment and allows litter to accumulate. Rest rotation would also allow flexibility in livestock management during periods of drought.

Under the tree pasture rest rotation system (RR1), herbaceous key species would rest during the critical part of the growing period two out of three years. As a result, the vigor of existing plants would be significantly improved and seedlings would have a chance to become established. The annual two pasture systems (RR3) would provide rest during the critical part of the growing period every other year. This rest would maintain vigor of existing plants. The two pasture system providing two consecutive years of rest (RR2) would result in improved vigor of existing plants. Seedling establishment could be interrupted if early spring grazing occurred under this system. Of the three proposed rest rotation systems, only the three pasture system would result in significant increases in key species (both herbaceous and woody). The other two systems, while enhancing key species vigor would maintain the species composition at current levels.

Exclusion

Exclusion consists of no authorized livestock grazing use. Under the proposed action and all alternatives, small areas, usually containing riparian vegetation, would be excluded from livestock grazing (see Table 1-2). The implementation of Alternative 3 would result in the additional exclusion of livestock from native range within the two wild horse herd management areas.

There would be an initial improvement in vigor of herbaceous key species in exclusion areas because the reduced level of utilization would allow most key species the opportunity to complete vegetative growth and reproduction.

Under Alternative 3, the annual consumption of approximately 15,000 AUMs of livestock forage -- much of it during the critical part of the growing season -- by wild horses would prevent key species increases from occurring on native range within the two herd management areas. This would offset any benefits expected from livestock exclusion. Herbaceous key species would decrease in areas of concentration such as waterholes and spring sites.

Temporary exclusion (TEX) of livestock would occur for a period of at least 5 years on 716 acres under the proposed action and 224 acres under Alternatives 1 and 2. This would allow the key species, particularly those in the riparian areas, to increase in composition. Upon resumption of livestock grazing, the proposed management would maintain the improved species composition in these areas.

Range Improvements

The removal of vegetation inherent in completion of the range improvements (Appendix B, Table B-3) would cause both a short term (1 to 5 years) and long term (over 5 years) disturbance of vegetation as shown in Table 3-2. In addition, a decrease in the composition of key species would occur on 5 to 10 acres around each new water development as a result of heavy utilization.

Table 3-2 Acres of Vegetation Disturbance Due to Range Improvements [1]

	Water Developments [2]		Fences		Vegetation Manipulation [3]	
	Short term	Long term	Short term	Long term	Short term	Long [4] term
Proposed Action	261	195	88	0	58,314	58,314
Alternative 2	261	195	116	0	83,805	83,805
Alternative 3	172	134	90	0	23,462	23,462

[1] No range improvements are proposed under Alternative 1.
[2] Includes springs, reservoirs, wells, pipelines and waterholes. [3] Includes brush control and seeding.
[4] Consists of long-term changes in species composition.

Vegetation manipulation is proposed primarily on poor condition big sagebrush vegetation types where significant improvement would require more than 10 to 15 years using grazing management alone. The acreage of vegetation disturbance shown in Table 3-2 for vegetation manipulation represents a conversion of approximately 11 percent of the big sagebrush type under Alternative 2; 8 percent under the proposed action; and 3 percent under Alternative 3.

The expected species composition of the treated area would depend primarily on the proposed method of brush control and whether the area would be seeded. Crested wheatgrass along with other suitable species would be seeded on 80,812 acres under Alternative 2; 55,703 acres under the proposed action; and 23,462 acres under Alternative 3. Based on observations of existing seedings in the EIS area and studies of similar areas in Oregon (Findley 1974), crested wheatgrass would compose 50 to 90 percent of the seeded area. Species composition would vary according to the success of the brush control, the survival of other species in the seed mixture and the amount of precipitation in the year following seeding.

The proposed methods of brush control are burning and spraying. Sagebrush would be reduced from the areas using burning as the method of brush control because sagebrush does not resprout following fire. The effect of burning on perennial bunchgrasses varies with the intensity of the fire, season of the burn and the species of grass. Sandberg bluegrass, junegrass, bluebunch wheatgrass and squirreltail, where present, would increase on areas proposed for burning. Since Thurber's needlegrass and Idaho fescue have been shown in some studies to be significantly damaged by burning (Britton 1978), the amounts of these species would be at least temporarily reduced in the burned areas. Several studies in Idaho indicate that fall burning does not harm most forb species (Britton 1978). Spring burning on Forest Service-administered lands near the EIS area significantly improved the vigor of forb species (Adams 1980).

The proposed spraying of 2,4-D for brush control would temporarily reduce sagebrush in the treated areas. Spraying would be in accordance with the standard procedures and design elements described in Chapter 1. Increases in native bunchgrass production of more than 200 percent have been shown to occur following spraying of sagebrush with 2,4-D (Hyatt 1966). Annual forbs such as mustards would increase, while perennial forbs such as lupine and buckwheat would decrease immediately following spraying although reestablishment is expected over the long term. Mueggler and Blaisdell (1958) showed about a 30 percent increase in total forb production several years following spraying of sagebrush.

Some of the new spring developments would cause a major change in species composition in riparian areas. As springs are developed, water previously supporting small areas of riparian vegetation would be diverted to livestock water troughs. Fencing would protect any remaining vegetation on the overflow areas. Over the long term, more riparian vegetation would be protected by fencing than would be lost through spring development.

The construction of water developments would have a localized impact on the vegetation around each development. Livestock tend to congregate around water, eating all the available forage in the immediate vicinity. The development of new water sources would also allow livestock to use an unquantified amount of previously unavailable forage and thus would reduce grazing pressure on areas near existing water sources. The new water areas would lead to more uniform livestock grazing use and result in fewer heavily grazed acres. Thus, water developments combined with grazing systems would promote an increase in the composition of the key species.

Forage Condition

The future forage condition of the study area is highly dependent upon the changes in vegetation characteristics described in the previous sections. As key species composition increases, forage conditions will improve. Expected forage conditions over the long term are shown in Table 3-1, Summary of Impacts to Vegetation.

Expected long-term changes in forage condition are based on several assumptions which are derived from observations of district personnel, study data, review of pertinent literature and professional judgment. See Appendix E for methodology. The assumptions used to predict future forage condition include the following:

- Grazing systems which satisfy the physiological requirements of plants for growth and reproduction (see Grazing Systems, this chapter) would improve fair condition range to good condition. Conversely, systems which do not allow plants the opportunity to make and store food would result in the deterioration of good to fair and fair to poor condition range. Cook (1966) states that "Carbohydrate reserve exhaustion can be the primary cause of changes in range condition. The more palatable species are grazed more intensively and frequently than unpalatable plants. The carbohydrate reserves in the heavily grazed plants are gradually reduced while the less palatable species have optimum reserves." Although some improvement of poor condition range can be expected, the rate of improvement is much slower than better condition range. Studies by McLean and Tisdale (1972) and Owensby et al. (1973) showed that at least 20, and as much as 40, years of complete rest would be required for poor condition range to completely recover. It is

estimated that approzimately 189,000 acres of poor condition range in the big sagebrush vegetation type would not respond to grazing management over the long term.

- Poor and fair condition ranges proposed for vegetation manipulation would improve to good condition over the long term. These areas would have significant increases in key species composition and residual ground cover.

- Good condition ranges which would have increases in key species and vegetative cover would remain classified in good condition.

Forage Production

Forage production is highly dependent upon the composition of the key species and is thus also related to forage condition. This relationship is due to the key species being the preferred forage species. When key species increase under proper grazing management, forage production also increases; vice versa, as the key species composition decreases, forage production also declines. In a review of several grazing studies on western ranges, Van Poolen (1979) concluded that production increases between 5 and 21 percent were attributable to the implementation of grazing systems.

The future forage production as outlined on Table 3-1 was predicted using the methodology outlined in Appendix C. The future forage production of both the seeded and native range areas was based upon the present production of areas which have undergone similar treatments. Varying levels of increase in forage production are expected under the proposed action and Alternatives 2 and 3. The decline in key species composition under Alternative 1 would result in a significant but unquantitied decrease in forage production.

Residual Ground Cover

The long term estimated changes in total residual ground cover (see Glossary) shown in Table 3-1, Summary of Impacts to Vegetation, are based on expected changes in livestock utilization, key species composition and total herbage production.

A significant decrease in total residual ground cover would occur on 31 allotments under the proposed action, Alternative 1 and Alternative 2. A similar decrease would occur on 27 allotments under Alternative 3. These allotments would have increases in the allowable level of use by livestock. Decreases in total residual ground cover would also occur on sites distrubed by the construction of range improvements (see Table 3-2) and concentration areas (5 to 10 acres each) around water developments.

Partially offsetting this decrease in total cover would be a change in the structure of the cover on allotments with predicted increases in key species composition. On these allotments a larger proportion of the total residual cover would be composed of fibrous rooted perennial herbaceous species.

Perennial species provide more year around cover than annuals because there is less year-to-year variation in production and most of the plant material remains intact throughout the fall and winter.

Vegetation manipulation projects which would reduce short-term herbage production would also produce short-term decreases in live vegetative cover. However, over the long-term residual ground cover would return to pretreatment levels. The largest short-term reduction of residual ground cover would occur on the areas using burning for the proposed method of brush control because persistent litter would be consumed by the fire.

No significant change in wildfire occurrence is expected by the projected changes in residual ground cover. Perennials remain green longer than annuals and are not as susceptible to fire as sagebrush overstory/annual understory areas.

Riparian Vegetation

Impacts to riparian vegetation are primarily based on the change in the amount of woody species (primarily willow) in streamside riparian areas and herbaceous species (primarily sedges and rushes) in the riparian areas associated with ponds and reservoirs. Response to grazing management would occur primarily in the streamside riparian areas which are currently in poor or fair wildlife habitat condition (43 percent of the total).

It is these areas, most of which are under spring/summer grazing management, that would show significant change in woody species composition under the proposed action and Alternatives 2 and 3. Observations in the Burns district and in adjoining BLM districts in eastern Oregon indicate that a rapid increase in woody species in streamside riparian areas results from the exclusion of livestock. During the first few years of protection from grazing, there is a period of rapid shoot growth and establishment of seedlings. Normal growth resumes when the riparian vegetation reaches an equilibrium with its source of nutrients, usually after a period of at least 5 years. It is during this stage when periodic, light to moderate levels of grazing can maintain and even enhance the production of the woody species in the community.

Alternative 3 and the proposed action would result in the largest increase in woody species in riparian areas by excluding livestock from 97 percent and 73 percent, respectively, of the streamside riparian vegetation in poor and fair condition. Alternatives 1 and 2 would provide protection for less than 1

percent of these areas. Poor condition areas such as those along Skull, Silver and Landing Creeks would show little or no increase in woody species under any system except exclusion. Small unquantified areas of access by livestock adjacent to exclusion areas (water gaps) would have virtually all woody vegetation removed.

The current condition of 117 acres of riparian vegetation associated with ponds and reservoirs has not been inventoried. The existing and proposed grazing systems in these areas are designed to provide rest during the critical part of the growing season for the herbaceous key species. Under the proposed action and all alternatives, between 30 and 40 percent of these riparian areas would show an upward trend in condition. The remainder of the riparian areas associated with ponds and reservoirs would be static. Table 3-6 compares the expected trend on these areas for each alternative. One area, Bigfoot Reservoir, under Alternative 2 would show a downward trend due to the spring/summer grazing use in alternate years.

The maximum benefit to herbaceous species composition on playas would occur under rest rotation and exclusion. Spring/summer grazing would reduce herbaceous key species in these areas. Table 3-11 compares the expected trend of wildlife habitat condition for playas (which correlates closely to herbaceous species composition).

Of the proposed range improvements, only spring development would have a direct impact on the riparian vegetation. In total, these projects would cause a short term disturbance of about 3 acres of riparian vegetation. However, in the long term, fencing of spring developments and the subsequent exclusion of grazing within the fenced areas would increase the composition and production of the key species in the riparian areas.

Threatened, Endangered and Sensitive Plants

Site specific information concerning the impact of current livestock grazing is lacking for the seven plant species under review for Federal listing as threatened or endangered status and the 22 plants considered as sensitive by BLM (shown in Table 2-3). Therefore, the impact of proposed changes in grazing management cannot be accurately predicted. Adverse impacts due to vegetation manipulation and range improvement construction would be avoided by conducting intensive plant inventories of the project area and modifying the design as needed in accordance with Bureau policy (Chapter 1). The protection of the only known population of Malheur wirelettuce **(Stephanomeria malheurensis)** from livestock grazing would continue under the proposed action and all alternatives. Although the population of this plant has declined since construction of the grazing exclosure, the long term impact of protection from grazing is unknown. Factors such as soil moisture and competition from other species within the exclosure may be responsible for the recent decline in population levels. Grass species which compete with the Malheur wirelettuce for nutrients and soil moisture may be favored by the exclusion of livestock from the site.

Conclusions

The analysis of impacts to vegetation as quantified in Table 3-1 leads to the following major conclusions:

- The proposed action and Alternatives 2 and 3 would result in varying levels of improvement in forage condition and increases in livestock forage production. These beneficial impacts to vegetation are chiefly due to the implementation of grazing systems which provide periodic rest during the critical part of the growing season and the implementation of vegetation treatments which increase the species composition of perennial grasses. Alternative 1 would result in a net decline in condition and a unquantified decrease in forage production primarily due to the continuation of grazing systems which would not provide periodic rest during the critical part of the growing season.

- A net decrease in total residual ground cover would occur under all the alternatives. This decrease would be offset by a change in the composition of gound cover from nonpersistent annuals to persistent perennials under the proposed action and Alternatives 2 and 3.

- The proposed action and Alternative 3 would result in significant increases in woody key species in poor and fair condition streamside riparian areas.

- Impacts to threatened, endangered and sensitive plants from grazing management are largely unknown.

- An irretrievable loss of 195 acres (the proposed action and Alternative 2) or 134 acres (Altenative 3) of vegetation would occur. This loss, due to the construction of range improvements, is reversible if the improvements are removed.

IMPACTS ON SOILS

Under the proposed action and Alternatives 2 and 3, the proposed vegetation allocation and grazing systems would increase protection of the soil from erosion. Although total residual ground cover would decrease, the proportion of cover which is made up of perennial grass species would increase. Perennial grasses have a more extensive root system to hold soil in place and provide, on the average, more persistent ground cover than annuals. Bailey and

Copeland (1961 Cited by Mattison et al. 1977) found that as perennial vegetation and litter cover increased, overland flow of water and erosion decreased. This protective cover would reduce soil movement, reduce raindrop impact and decrease compaction, thus increasing infiltration into the soil. Under Alternative 1, soil erosion would increase due to a reduction in the proportion of ground cover made up of perennials. Erosion would remain the same or increase slightly on wild horse herd management areas under Alternative 3, due to continuous use by wild horses.

Erosion would continue to be greater on the Basin Land and Terrace soils than on the Upland soils for the proposed action and all alternatives, although the total amount of erosion would be reduced from existing levels.

Streambank erosion would be affected by changes in riparian vegetation. Increases of riparian vegetation, including woody plants, would help stabilize streambanks and decrease erosion (shown in Table 3-3 and demonstrated by the Wickiup Creek plant study on file at the Burns District Office). In general, streambank erosion would decrease on allotments with exclusion and temporary exclusion; would continue at present rates on allotments with rest rotation grazing systems; and would increase on allotments with deferred rotation and spring/summer grazing systems. See Table 3-3 for streambank erosion by alternative.

The construction of range improvements under the proposed action and Alternatives 2 and 3 would temporarily disturb the soil surface (see Table 3-4). The disturbance would subject those acres to wind and water erosion. This impact would lessen as the areas became revegetated in 1 to 2 years.

Livestock would concentrate around the proposed water developments. Approximately 10 acres around reservoirs, waterholes and troughs along pipelines, and 5 acres around springs would be heavily grazed. Residual ground cover would thus decrease these areas, thereby increasing erosion. Erosion would also increase along some new fence lines due to trailing by livestock under the proposed action and Alternatives 2 and 3.

On areas proposed for vegetation manipulation, short term increases in wind erosion would occur on Sandy soils if burning were the treatment used. Two seedings under Alternative 2 contain 2,162 acres of Sandy soils. In the long term, wind erosion would return to existing levels after the seedings become established.

No range improvements are proposed under Alternative 1.

Table 3-3 Streambank Erosion Trend (miles)

Streambank Erosion	Proposed Action	Alternatives 1 No Action	2 Emphasize Livestock	3 Emphasize Non Livestock
Increasing	0	3.6	2.8	0
Static	27.3	30.8	30.1	7.5
Decreasing	8.4	1.3	2.8	28.2

Table 3-4 Soil Disturbance by Proposed Range Improvements [1]

Range Improvements	Proposed Action			Alternative 2 Emphasize Livestock			Alternative 3 Emphasize Non-Livestock		
	Units	(Acres) Temp.	Perm.	Units	(Acres) Temp.	Perm.	Units	(Acres) Temp.	Perm.
Fences	176 mi.	88	0	232 mi.	116	0	180 mi.	90	0
Springs	8 ea.	2	0	8 ea.	2	0	13 ea.	3.25	0
Wells	5 ea.	2.5	1.25	5 ea.	2.5	1.25	2 ea.	1	0.5
Pipelines	62 mi.	124	62	62 mi.	124	62	35 mi.	70	35
Reservoirs	43 ea.	86	86	43 ea.	86	86	40 ea.	80	80
Waterholes	23 ea.	46	46	23 ea.	46	46	9 ea.	18	18
Seeding	55,703 ac.	55,703	0	80,812 ac.	80,812	0	23,462 ac.	23,462	0
Brush Control [2]	2,611 ac.	2,611	0	2,993 ac.	2,993	0	0 ac.	0	0
		58,662.5	195.25		84,181.5	195.25		23,724.25	133.5

[1] There would be no range improvements constructed under Alternative 1.
[2] These acres would not have actual surface disturbance as would occur with construction of the other range improvements. However, if burned, the existing vegetation would be removed, exposing the soil to wind and water erosion. If sprayed instead, there would be no acres disturbed as the dead vegetation would help protect the soil surface from erosion.

IMPACT ON WATER RESOURCES

Water Quantity

A number of studies (Rauzi and Hanson 1966; Alderfer and Robinson 1974; Hanson et al. 1972) have shown that heavily grazed areas and areas in poor condition produce more runoff than lightly and moderately grazed areas and those in good condition. However, most of these studies were done on the effects of grazing on runoff from rainfall. Most of the annual runoff on sagebrush watersheds, such as in the Riley EIS area, occurs during the snowmelt period (Sturges 1978), and thus occurs over frozen soils. Soil compaction by livestock, therefore, may not be significant since the runoff is not controlled by the rate of infiltration of water into the soil. Changes in grazing intensity and expected improvement in forage condition under the proposed action and Alternatives 2 and 3 are not expected to significantly affect runoff. Runoff is also not expected to change significantly under Alternative 1.

Less water would reach downstream users due to the construction of reservoirs under the proposed action and Alternatives 2 and 3. Since each reservoir would hold approximately 2 acre-feet the total impoundment would be 80 to 86 acre/feet/year under these alternatives. The total impoundment would be less than 0.1 percent of the annual runoff from public lands in the EIS area. No reservoirs are proposed under Alternative 1. Construction of waterholes would not affect downstream use since waterholes are built in dry lakebeds that are sinks for small internally-drained watersheds.

The amount of groundwater withdrawn from the proposed wells under any alternative would not significantly impact the resource.

Water Quality

Chemical constituents are not likely to change since the chemical composition depends on the source of the water and the geological substrate. Most fecal coliform degradation of water quality comes from use in or directly adjacent to streams (Johnson et al. 1978; Robbins 1978). Fencing 8.4 miles of streams in riparian areas under the proposed action and 30 miles under Alternative 3 would remove livestock concentration along perennial streams and thus decrease fecal coliforms from livestock. Under Alternatives 1 and 2, fecal coliform levels would remain the same as the present situation.

The herbicide 2,4-D would be used under the proposed action and under Alternatives 2 and 3. No significant impacts to water quality would be expected due to the use of buffer strips 100 feet wide on both sides of perennial streams and around other water sources. (See Chapter 1, Standard Procedures and Design Elements for Range Improvements.)

Moreover, most of the proposed projects are located further than 100 feet away from perennial streams. No herbicides would be applied under Alternative 1.

The construction of range improvements would temporarily increase the existing sediment yield. The disturbed acres are expected to become revegetated within 1 to 2 years. After revegetation, sediment yields would return to the previous undisturbed levels or lower, since residual ground cover would return to existing levels. Headcutting would occur below the proposed reservoirs due to increased slope of the spillway. Reservoirs developed in Basin Land and Terrace soils could increase erosion and sediment production because of these soils' erodible nature.

In the long term, the change in the composition of residual ground cover on upland areas due to the implementation of grazing systems and range improvements under the proposed action and Alternatives 2 and 3 would slightly decrease the sediment yield in the area. With the soil protected from erosion, less soil is detached and carried to streams resulting in an improvement in water quality. Under Alternative 1, sediment yield would increase over present levels.

The anticipated improvement in riparian vegetation and decrease in streambank erosion (see Table 3-3) would result in a decrease in sediment yield along those streams. As woody riparian vegetation increases, shading of the streams would occur, resulting in lower water temperatures.

IMPACTS ON WILDLIFE

Wildlife would experience both primary and secondary impacts. Primary impacts affect wildlife populations directly. Some examples of primary impacts are: avoidance of livestock by big game; deer and antelope fence mortalities; nest disturbance or destruction from livestock trampling; animal displacement from burning and seeding. Most primary impacts are not discussed because they are believed to be insignificant in the long term. Although individuals are lost, population trends are unaffected.

Secondary impacts affect wildlife populations indirectly by changing the vegetation or wildlife habitat. Some examples are: loss of sagebrush cover from herbicide spraying; increased nesting habitat in riparian areas; siltation of stream bottoms from exposed banks. These secondary impacts to wildlife habitat have been found to be significant. Without the required habitat for reproduction or for protection during severe weather, wildlife populations will quickly decline.

Wildlife populations in the EIS area have not been monitored to determine the impact of grazing systems and range improvements. Therefore, impact analysis was based on less direct methods which

focus on wildlife habitat. Some considerations in predicting impacts were:

1. Condition of habitat as based on visual observation of district personnel and limited habitat inventory.
2. Potential of wildlife habitat to respond to a specific grazing system or livestock exclusion.
3. Predicted impacts to vegetation as they affect wildlife.
4. Research applicable to the EIS area.
5. Field observations of past impacts to wildlife populations and their habitat.

Population predictions were based on the assumption that weather, hunting, disease and predation would be constant. However, predation may prevent population increases. A recent study by ODFW found that 80 percent of the marked antelope fawns were killed by predators, primarily coyotes (Willis undated). All predicted impacts to populations were assumed to be from habitat changes. Generally an action which increases habitat diversity would also increase the numbers and kinds of wildlife. Therefore, an action which increases habitat diversity would also increase the numbers and kinds of wildlife.

The herbicide 2,4-D is not expected to have direct impacts on wildlife. When used as manufacturer's label prescribes, 2,4-D has not been reported to be poisonous to wildlife. In a worst case situation, drift may result in important food and cover patches being sprayed.

Wildlife Habitat in Riparian Areas

Impacts in riparian areas are significant because these areas contain the greatest densities and varieties of species (Thomas et al. 1979). Along some streams riparian habitat has deteriorated to poor condition indirectly because of livestock grazing. Livestock grazing has removed riparian vegetation, trampled streambanks and compacted soils in adjacent riparian areas. Without protective riparian vegetation, stream channels are unstable and vulnerable to further damage and deterioration every year. Exposed stream banks on public lands contribute to increased sediment during flooding. Buzzard Creek is an example of how headcutting (see Glossary) and resulting lowered water tables have eliminated meadow vegetation in the EIS area. With poor riparian habitat, soil water retention is reduced, leading to drying of more stream area during summer and autumn.

Impact predictions were made by comparing existing grazing and condition with proposed grazing at each riparian area (Table 3-5). Results from these site specific analyses were totaled to indicate long-term condition and trend of riparian habitat (Table 3-6 and 3-7).

Impact predictions made in the vegetation section were used to predict wildlife habitat trend. For example, an increase in woody vegetation would result in an upward wildlife habitat trend.

Grazing Systems

Exclusion of grazing would result in rapid improvement of wildlife habitat (Winegar 1977). Livestock exclusion along Wickiup Creek has resulted in upward trend and greatly improved wildlife habitat condition The removal of grazing allowed both woody and herbaceous plants to increase, providing an increase in habitat diversity. Similar riparian areas with a high potential for improvement would be expected to improve one or two condition classes. Temporary exclusion would result in rapid improvement of wildlife habitat during the exclusion phase. Subsequent grazing at moderate utilization levels would maintain improved habitat as compared to the existing situation. Watergaps, provided by the proposed action and alternatives, would receive heavy livestock use, resulting in poor wildlife habitat at these locations. See Table 3-8 for grazing management in riparian areas.

The spring/summer system would result in heavy livestock utilization during the growing season each year. Wildlife habitat would deteriorate with this system (primarily Alternative 1).

Deferred rotation would replace spring/summer grazing on several stream segments. With deferred rotation increased wildlife cover during the deferral period is often grazed off later during the summer or in the following year. Improved herbaceous vegetation would improve conditions for ground nesting wildlife. Young willows would continue to be grazed off resulting in no improvement for wildlife dependent on woody riparian vegetation (see vegetation section - deferred grazing). Streamside riparian habitat in deferred rotation would remain in present condition with static trend.

Deferred, deferred rotation and rest rotation grazing on the Silvies River, Silver Creek and Landing Creek would maintain present conditions. Steep rocky slopes and/or dense cover of woody species prevent heavy livestock use.

Development of springs would initially destroy some wildlife habitat in riparian areas at each spring site. About 0.25 acre at each site would be affected. Where fencing of overflows is proposed, lost habitat would be replaced in the long term.

Fish

Impact predictions were made by comparing existing grazing and fish habitat condition with proposed grazing management at each stream segment (2.2 miles). Results from site specific analyses were

Table 3-5 Riparian Habitat Impact Analysis

Riparian Area	Allot	Miles	Acres	Existing Condition	Proposed Action Grazing System	Proposed Action Trend	Proposed Action Condition	Alternative 1 No Action Grazing System	Alternative 1 No Action Trend	Alternative 1 No Action Condition	Alternative 2 Emphasize Livestock Grazing System	Alternative 2 Emphasize Livestock Trend	Alternative 2 Emphasize Livestock Condition	Alternative 3 Emphasize Non-Livestock Grazing System	Alternative 3 Emphasize Non-Livestock Trend	Alternative 3 Emphasize Non-Livestock Condition
SKULL CREEK	7030	3.50	23.5	P	DR2	S	P	DR2	S	P	DR2	S	P	EX	U	G
ROUGH CREEK	7010	0.75	17.0	?	TEX	U	G	SS	S	?	DR2	S	?	EX	U	G
BUZZARD CREEK	7002	1.50	14.0	P	EX	U	G	SS	S	P	DR1	U	P	EX	U	G
BUZZARD SPRING	7002	0.50	5.0	P	EX	U	G	SS	D	P	DR1	S	P	EX	U	G
NICOLL CREEK	7009	1.50	8.8	G	DR2	S	G	SS	S	G	DR2	S	G	EX	U	E
DAIRY CREEK	7010	1.20	8.2	F	DR2	U	F	SS	S	F	DR2	S	F	EX	U	G
UPPER CLAW CREEK	7010	0.80	42.1	F	TEX	U	G	SS	D	F	DR2	D	F	EX	U	G
LOWER CLAW CREEK	7010	0.30	2.0	F	DR2	U	F	SS	S	F	DR2	S	F	EX	U	G
LOWER CLAW CREEK	7011	0.70	13.6	E	FFR	S	E	FFR	S	E	FFR	S	E	EX	S	E
WICKIUP CREEK	7012	1.25	18.0	G	TEX	U	E	TEX	U	E	TEX	U	E	EX	U	E
MINERAL CREEK	7012	0.20	0.5	P	TEX	S	P	TEX	S	P	TEX	S	P	EX	S	P
EMIGRANT CREEK	7027	0.30	1.0	G	FFR	S	G	FFR	S	G	FFR	S	G	EX	U	E
EMIGRANT CREEK	7031	1.00	4.0	?	DR1	S	?	DR1	S	?	DR1	S	?	EX	U	?
EMIGRANT CREEK	7051	0.20	1.0	?	FFR	S	?	FFR	S	?	FFR	S	?	FFR	S	?
SPRING CREEK	7029	0.50	3.0	G	FFR	S	G	FFR	S	G	FFR	S	G	FFR	S	G
HAY CREEK	7031	2.00	35.0	P	EX	U	F	SS	D	P	SS	D	P	EX	U	F
VARIEN CREEK	7048	0.25	0.5	G	FFR	S	G	FFR	S	G	FFR	S	G	FFR	S	G
DEVINE CREEK	7080	3.00	20.0	E	UNA	S	E	UNA	S	E	UNA	S	E	UNA	S	E
SILVIES RIVER	7033	1.50	17.4	G	DR2	S	G	DR2	S	G	DR2	S	G	EX	U	E
SILVIES RIVER	7035	1.12	4.5	G	DF	S	G	DF	S	G	DF	S	G	DF	S	G
SILVIES RIVER	7053	2.25	26.2	G	DF	S	G	DF	S	G	DF	S	G	EX	U	E
LANDING CREEK	7035	0.25	5.0	P	FFR	S	P	FFR	S	P	FFR	S	P	FFR	S	P
LANDING CREEK	7040	3.00	24.2	G	RR2	S	G	RR2	S	G	RR2	S	G	EX	U	E
LANDING CREEK	7041	0.75	10.0	G	SS	S	G	SS	S	G	SS	S	G	EX	U	E
SILVER CREEK	7010	0.12	7.0	F	DR2	S	F	SS	S	F	DR2	S	F	EX	U	G
SILVER CREEK	7010	2.00	15.2	G	DR2	S	G	SS	S	G	DR2	S	G	EX	U	E
SILVER CREEK	7010	0.34	25.0	P	TEX	U	G	SS	D	P	DR2	S	P	EX	U	G
SILVER CREEK	7009	2.00	17.5	E	DR2	S	E	SS	S	E	DR2	S	E	EX	U	E
SILVER CREEK	7011	1.00	7.0	E	FFR	S	E	FFR	S	E	FFR	S	E	EX	U	E
SILVER CREEK	7012	1.00	7.0	G	EX	S	E	EX	S	E	DR1	S	G	EX	S	E
BEAVERDAM CREEK	7051	0.30	1.0	?	FFR	S	?	FFR	S	?	FFR	S	?	FFR	S	?
SAWMILL CREEK	7011	0.60	3.0	G	FFR	S	G	FFR	S	G	FFR	S	G	EX	U	E
BIGFOOT RESERVOIR	7001	6.0		G	EX	U	E	EX	U	E	RR3	D	F	EX	U	E
SILVER LAKE POND	7018	60.0		?	DF	S	?	DF	S	?	DF	S	?	DF	S	?
MOON RESERVOIR	7018	8.0		?	DF	S	?	DF	S	?	DF	S	?	DF	S	?
WILLOW RESERVOIR	7030	2.0		?	DR2	S	?	DR2	S	?	DR2	S	?	EX	U	?
GREEN SPOT RESERVOIR	7030	3.0		?	EX	U	?	DR2	S	?	EA	S	?	EX	U	?
SEILOFF SPRING	7002	35.0		?	EX	U	?	EX	U	?	EX	U	?	EX	U	?
STATE RESERVOIR	7030	3.0		?	EX	U	?	DR2	S	?	DR2	S	?	EX	U	?

Key

Grazing System
EA - Spring
SS - Spring/Summer
DF - Deferred
DR1 - Annual deferred rotation
DR2 -Biannual deferred rotation
RR2 -2 pasture biannual rest rotation
RR3 - 2 pasture annual rest rotation
EX - Exclusion
TEX - Temporary Exclusion
FFR Fenced Federal Range
UNA - Unalloted

Condition
E - Excellent
G - Good
F - Fair
P - Poor
? - Unknown

Trend
U - UP
D - Down
S - Static

Table 3-6 Expected Long-Term Condition and Trend of Wildlife Habitat in Streamside Riparian Areas--Public Acres (miles)

Condition	Existing Situation		Proposed Action		Alt. 1 No Action		Alt. 2 Emphasize Livestock		Alt. 3 Emphasize Non-Lvstk	
Excellent	58	(6.7)	83	(9)	83	(9)	76	(8)	189	(20.8)
Good	139	(16)	217	(17.9)	114	(5.9)	121	(14.8)	152	(2.0)
Fair	59	(2.4)	52	(3.6)	83	(13.8)	59	(2.4)	35	(10.9)
Poor	108	(8.3)	29	(4.0)	84	(4.8)	108	(8.3)	5	(.5)
Unknown	23	(2.3)	6	(1.5)	23	(2.2)	23	(2.2)	6	(1.5)
Total	387	(35.7)	387	(35.7)	387	(35.7)	387	(35.7)	387	(35.7)
Trend										
Up	-	-	164	(8.4)	18	(1.3)	77	(2.8)	331	(28.2)
Static	-	-	223	(27.3)	262	(30.8)	278	(30.1)	56	(7.5)
Down	-	-	0	(0)	107	(3.6)	32	(2.8)	0	(0)
Total			387	(35.7)	387	(35.7)	387	(35.7)	387	(35.7)

Table 3-7 Expected Long-Term Trend of Riparian Habitat at Reservoirs, Springs and Ponds (Public Acres)

Trend	Existing	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Lvstk
Up	-	47	41	35	49
Static	-	70	76	76	68
Down	-	0	0	6	0
Totals		117	117	117	117

Table 3-8 Grazing Management in Riparian Areas (Public Acres)

Type of Grazing of Management	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Lvstk
Exclude Livestock	108	48	35	401
Temporary Exclusion	103	18	18	-
Deferred Rotation 1	4	4	30	-
Deferred Rotation 2	96	44	144	-
Deferred	104	104	104	78
Rest Rotation 2	24	24	24	-
Rest Rotation 3	-	-	6	-
Spring/Summer	10	207	45	-
Early Fenced Federal Range	35	35	35	5
Unalloted	20	20	20	20
Totals	504	504	504	504

totaled to indicate long-term condition and trend (Table 3-9). Poor or fair fish habitat on BLM-administered lands is primarily due to high sediment loads, low flows and poor riparian vegetation. Improved woody and herbaceous (riparian) vegetation from livestock exclusion at Hay Creek would improve fish habitat with the proposed action and Alternative 3. Improved woody and herbaceous vegetation would decrease water temperature; improve summer flows and spawning gravel; and increase pools, cover and insects. In Alternative 3, 1 mile of Skull Creek would improve due to improved riparian vegetation. Fish habitat at Wickiup Creek (1.4 miles) would continue to improve under all alternatives due to livestock exclusion. All other streams would remain in their present condition class. Although the proposed action and Alternative 3 would improve riparian vegetation on several other streams, fish habitat is not expected to improve because upstream uses on non-BLM lands have caused poor water quality and sediment deposition on several BLM portions of streams (Claw Creek, Silvies River, Nicoll Creek, Silver Creek).

Fish habitat at most reservoirs is in good condition. Livestock management under the proposed action and all alternatives is not expected to have a significant effect.

Water-Associated Birds

Livestock grazing in riparian areas and playas affects water-associated birds. Trampling, nest disturbance and removal of required herbaceous residual cover can reduce nesting success. Food plants such as smartweed and sedge are often grazed before they can be utilized by birds. Livestock trampling causes compaction and loss of vegetation which reduces food and cover for birds.

See Table 3-10 for playa habitat analyses and Table 3-11 for expected long-term trend. Impacts in other riparian areas have been previously described (Tables 3-6 and 3-7).

Livestock exclusion would greatly improve nesting cover and food. Nesting success and bird use can be expected to increase at areas such as Green Spot Reservoir, Lake on the Trail and Seiloff Springs. The rest treatment of rest rotation systems would provide good nesting cover the following spring. However, grazed pastures in rest rotation systems would result in poor nesting cover and food. Habitat at Foster Lake has improved with rest rotation grazing. Spring-summer grazing would result in very low bird production because of season-long use of vegetation. Resulting plant composition would be less desirable for most birds. Conversion of spring/summer grazing to deferred rotation would improve cover and desirable species composition. Existing deferred rotation systems would maintain present conditions. Heavy livestock use of food and cover plants would continue. Bird reproduction would be low.

Proposed waterholes and reservoirs would increase habitat by about 2 acres at each site (Table 1-1). Bird distribution would be increased.

Mule Deer and Antelope

Future trend of big game range was predicted by considering changes in grazing system, season of use and range improvement projects for each allotment and/or pasture. See Tables 3-12 and 3-13 for expected trend of deer and antelope habitat.

Table 3-9 Expected Long-Term Condition and Trend of Fish Habitat (Public Miles)

Condition	Existing Situation	Proposed Action	Alt. 1 No Action	Alt. 2 Emph. Livestock	Alt. 3 Emph. Non-Lvstk
Excellent	0	0	0	0	0
Good	5.9	8.4	6.2	6.2	8.4
Fair	12.9	11.5	13.7	13.7	12.5
Poor	10.3	9.2	9.2	9.2	9.2
Total	29.1	29.1	29.1	29.1	29.1
Trend					
Up	-	3.6	1.4	1.4	4.6
Static	-	25.5	27.7	22.7	24.5
Down	-	0	0	0	0
Total		29.1	29.1	29.1	29.1

Table 3-10 Playa Habitat Impact Analysis

Area	Allotment	Acres	Proposed Action Grazing System	Proposed Action Trend	Alternative 1 No Action Grazing System	Alternative 1 No Action Trend	Alternative 2 Emphasize Livestock Grazing System	Alternative 2 Emphasize Livestock Trend	Alternative 3 Emphasize Non-Livestock Grazing System	Alternative 3 Emphasize Non-Livestock Trend
LAKE ON TRAIL	7002	270	EX	U	SS	S	DR1	S	EX	U
FOSTER LAKE	7001	3,700	RR3	U	RR3	U	RR3	U	EX	U
LAMB LAKE	7007	60	DR2	S	DR2	S	DR2	S	DR2	S
SHEEP LAKE	7008	130	DR2	S	DR2	S	DR2	S	EX	U
CECIL LAKE	7008	150	DR2	S	DR2	S	DR2	S	EX	U
NORDEL LAKE	7008	110	DR2	S	DR2	S	DR2	S	EX	U
DRY LAKE	7009	130	DR2	U	SS	S	DR2	U	EX	U
W CHAIN LAKE	7019	100	DR1	S	DR1	S	DR1	S	EX	U
E CHAIN LAKE	7019	250	DR1	S	DR1	S	DR1	S	DR1	S
E CHAIN LAKE	7021	170	EX	U	RR3	S	RR3	S	EX	U
LAKEBED	7020	120	DR2	U	SS	S	DR2	U	DR2	U
WEAVER LAKE	7021	300	RR3	S	RR3	S	RR3	S	EX	U
LAKEBED	7088	40	FFR	S	FFR	S	FFR	S	FFR	S
RIMROCK LAKE	7006	95	DR2	U	SS	S	DR2	U	EX	U

Key

Grazing System
EX - Exclusion
DR1 - Annual deferred rotation
DR2 - Biannual deferred rotation
SS - Spring/Summer
RR3 - Two Pasture annual rest rotation
EA - Early
FFR - Fenced Federal Range
UNA - Unalloted

Trend
U - Up
D - Down
S - Static

Table 3-11 Expected Long-Term Wildlife Habitat Trend at Playas (Public Acres)

Trend	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Lvstk
Up	4,485	3,700	4,015	5,275
Static	1,140	1,925	1,925	350
Down	0	0	0	0
Totals	5,625	5,625	5,625	5,625

Table 3-12 Expected Trend Deer Habitat - (Public Acres)

	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Livestock
Up	200,800	11,500	177,400	180,800
Static	149,700	344,500	149,700	179,200
Down	9,500	4,000	32,900	0
Total	360,000	360,000	360,000	360,000

Table 3-13 Expected Trend Antelope Habitat - (Public Acres)

	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Livestock
Up	315,000	5,500	306,600	111,500
Static	154,000	451,500	154,000	292,000
Down	0	12,000	8,400	65,500
Total	469,000	469,000	469,000	469,000

Grazing systems would affect the quantity and quality of forage available to big game. In the proposed action, Alternatives 2 and 3, most of the spring-summer (season long) grazing would be changed to rest rotation or deferred rotation (Figure 1-4, Appendix B, Table B-2). Predicted improved range condition would increase forage available to big game. For example, in Allotment 7025 spring summer grazing is presently decreasing bitterbrush vigor which reduces forage available to deer. Rest rotation grazing would greatly increase bitterbrush production for use by deer.

Several studies have shown that prescribed livestock grazing during certain seasons is beneficial to big game (Andersen 1975, Leckenby et al. 1980, Tueller 1979, Urness 1966). Summer livestock grazing removes rank grass growth which hinders use by big game. Closely grazed grass plants produce new growth early in the spring which is critical to wintering deer. Grass plants grazed during the summer will often have regrowth during the fall, which is important to big game. Livestock would be allowed to graze through October 31 on 58 percent of the deer range (proposed action). Competition for browse and fall regrowth of grasses can be expected to continue. A variety of grazing treatments in the proposed action and Alternatives 2 and 3 would increase habitat diversity for big game. For example, rest rotation would provide grazed pastures adjacent to ungrazed areas.

In Alternative 3, horses would be increased and livestock eliminated in four allotments which includes 58,000 acres of deer habitat and 250,000 acres of antelope habitat. Season long grazing by increased numbers of horses may adversely affect big game through competition for water. Competition for forage is not expected because horses are primarily grass feeders and their densities would remain relatively low even at the proposed increased numbers.

Under the proposed action and Alternatives 2 and 3, sagebrush control and seedings would increase habitat diversity for wide-ranging big game animals by introducing herbaceous food within monotypic stands of sagebrush (Figure 1-2 and Table 3-14). Greatest habitat diversity would result from burning which would create the most edge between sagebrush cover and herbaceous food. Forbs, an important food source, would be increased with burning and decreased with herbicide spraying. In Alternative 2, sagebrush control would adversely affect wintering deer by greatly decreasing cover on 11,000 acres of winter range (Allotments 7004, 7019).

New water sources would reduce forage competition with livestock near existing waters and increase big game distribution. Some forage competition could result from livestock grazing in areas previously used primarily by big game. In seedings, improved distribution of livestock with water developments would increase desirable early growth of vegetation for deer and antelope. Fences which will be built primarily on upland sites are not expected to have a significant impact. A minor number of mortalities may occur, especially immediately after construction. Existing fences on public lands in the EIS area have not had a significant adverse impact to big game.

Other Mammals, Upland Game Birds, Other Birds, Amphibians and Reptiles

These animals are grouped to avoid repetition. Impacts are described in general terms and cover very broad areas; detailed analysis is not possible because site specific or species specific impacts from existing or proposed livestock management are largely unknown. Livestock grazing affects these species primarily through changes in condition of riparian areas, amount of residual ground cover in upland areas and vegetative composition. Riparian areas in good condition support more kinds and numbers of wildlife than areas in poor condition (see Riparian Habitat Section, this chapter). Residual ground cover includes dried herbaceous vegetation which persists through winter and spring. In all areas, this cover is very important for reproduction, escape from predators and maintenance of body temperatures. Long term, subtle changes in vegetative composition would improve habitat for some species and have adverse impacts on others. See Table 3-15 for summary of impacts to small animal population.

Livestock exclusion would significantly improve riparian habitat (Table 3-5). Winter cover, nesting cover and food would be increased. Increased shrub and tree growth in riparian areas would allow birds to nest in previously unoccupied areas. Species such as valley quail, spotted frog and beaver, which are strongly associated with riparian areas, would be greatly benefited. Sage grouse, which do not require dense riparian vegetation, would benefit only slightly. Studies at Camp Creek (25 miles northwest of the EIS area) have shown more kinds and total numbers

Table 3-14 Acres of Big Game Habitat Affected by Vegetation Manipulation

	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Lvstk
Deer Range	19,500	0	19,500	4,350
Antelope Range	24,000	0	24,000	17,000

Table 3-15 Summary of Impacts to Small Animal Populations

Animal Group	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Lvstk
Mammals	-L	NC	-L	+L
Upland Game Birds	NC	NC	-L	+L
Other Birds	-L	NC	-L	+L
Amphibians	+L	NC	NC	+L
Reptiles	-L	NC	-L	+L

Note: Increase is shown by +, Decrease by -, NC = No change from existing situation. Insufficient data prevent quantification. Anticipated changes are expressed using Low (L), Medium (M) and High (H).

of wildlife in protected riparian habitat compared to adjacent grazed habitat (Winegar 1977).

Grazing systems which increase perennial grass vigor would improve nesting cover for ground nesters such as horned larks. Rested pastures in rest rotation systems would have the greatest amount of residual vegetation for thermal cover and nesting. Grazing treatments during the following 1 or 2 years would result in decreased cover. The spring/summer system, which allows grazing during the critical part of the growing season each year, would result in very low amounts of residual cover due to decreased vigor. The other grazing systems are not expected to change habitat significantly.

Proposed range improvements by alternative are summarized in Table 1-1. Vegetation manipulation has immediate and often adverse impacts because of dramatic changes in vegetative composition. Removal of sagebrush through herbicide spraying or burning would have a severe adverse impact on individual animals which are dependent on sagebrush for food and cover (e.g., sage grouse, black-tailed jackrabbit). Besides killing sagebrush, 2,4-D would also reduce perennial forbs which are an important wildlife food source. Decreased sagebrush would be adverse to brush-nesters such as sage sparrows and mammals such as the pygmy rabbit (Olterman and Verts 1972). Loss of thermal cover would be adverse to reptiles such as horned lizards and leopard lizards (Storm 1966). Grassland species such as horned larks and ground squirrels would incease along with predators. Ferruginous hawks would not increase because suitable nesting sights would not be available in the treatment areas.

Sagebrush control, while increasing edge effect, decreases habitat for animals with small home ranges (e.g. sagebrush lizard, voles, mice, etc.). Untreated or leave patches would not entirely offset losses of food and cover. In general, the 40 percent treatment in Alternative 3 would create the most edge and have the least overall adverse impact. The 80 percent treatment level in Alternative 2 would severely decrease habitat diversity for small animals.

The proposed action and Alternative 2 would decrease sage grouse nesting habitat and winter cover because of sagebrush control adjacent to strutting grounds and in wintering areas. With no restrictions on sagebrush control in Alternative 2, about 14,000 acres (13 percent) of nesting and wintering habitat would be lost. Severe adverse impacts can be expected at 2 of 35 known strutting grounds because little nesting cover would be available. At these same sites, with the proposed action, sagebrush control would be limited to 50 percent in nesting and wintering habitat. Slightly adverse impacts can be expected.

In the short term, burning would moderately reduce populations. Some animals would be killed during the fire; others would be displaced to areas where they could not compete with the existing populations. Burning would benefit wildlife by creating a significant amount of edges. More herbaceous food would be available adjacent to sagebrush cover.

Reynolds and Trost (1978) found that crested wheatgrass plantings, regardless of livestock use, supported fewer nesting bird species and a lower density of birds, mammals and reptiles than did areas dominated by sagebrush. Nesting birds were reduced to a single species, the horned lark. Similar impacts can be expected in the EIS area. Seedings which establish forbs and shrubs in addition to crested wheatgrass would have greater habitat diversity than a seeding composed primarily of crested wheatgrass.

Wells, springs and pipelines would increase seasonal distribution of animals, primarily birds, which are able to drink from livestock troughs. Occasional drownings of small birds and mammals would occur in troughs despite escape ramps.

Increased sources of water provided by new reservoirs would increase distribution and numbers of species such as the mountain cottontail, Brewer's blackbird and spotted frog.

Threatened and Endangered Animals

Changes in bird and small mammal populations would not be great enough to significantly affect food for bald eagles or peregrine falcons in the proposed action or any alternative.

Active nesting or roost sites are not known in the EIS area.

Impacts to nesting snowy plovers are not expected. On public lands, the lake playas used by snowy plovers receive light or no livestock use.

Conclusions

Alternative 3 would improve 75 percent of the riparian habitat due to livestock exclusion. The proposed action would improve 56 percent of the riparian habitat due to livestock exclusion and grazing systems. Alternative 2 would slightly improve 41 percent of the riparian areas due to grazing systems. Alternative 1 would improve 16 percent of the riparian areas and allow about 15 percent to deteriorate due to spring/summer grazing.

Increased fish production can be expected on Hay Creek (Proposed Action, Alternative 3), Wickiup Creek (all alternatives) and Skull Creek (Alternative 3). Production would remain the same in all other streams and reservoirs.

Alternative 3 would significantly improve water associated bird habitat because of livestock exclusion and rest rotation of and deferred action grazing systems. Under Alternatives 1 and 2 a slight overall increase in bird production can be expected primarily because of livestock exclusion and rest rotation grazing.

Bureau actions affect only a portion of the total range used by deer. In addition to BLM-administered lands, deer rely heavily on private and National Forest lands. Therefore, changes in habitat on BLM-administered lands do not necessarily affect the deer population. Based on habitat improvement alone, the proposed action and Alternatives 2 and 3 would increase deer 5 to 20 percent. Alternative 1 would maintain existing populations.

Antelope populations are expected to increase 10 to 20 percent with the proposed action and Alternatives 2 and 3. Sagebrush control would convert dense stands of big sagebrush to low-growing herbaceous types preferred by antelope. Alternative 1 would maintain existing populations.

Overall impacts on small animal populations within the entire EIS area would be low. Some species would increase of decrease slightly depending on the alternative and degree of habitat modification. Localized impacts would be more pronounced.

Vegetation manipulation would significantly reduce bird, mammal and reptile populations on 11 percent (Alternative 2), 7 percent (proposed action), or 3 percent (Alternative 2) of the big sagebrush vegetation type. Bird and mammal populations can be expected to increase significantly at riparian areas excluded from livestock grazing. Amphibian populations would increase slightly due to riparian protection.

IMPACTS TO WILD HORSES AND BURROS

The proposed action and alternatives provide a vegetation allocation for the maximum planned number of adult horses (based on average populations of about 80 percent adults and 20 percent colts), as shown in Table 3-16.

The allocation of forage to planned levels of horses (except in Alternative 1) would decrease forage competition between horses and livestock under the proposed action and Alternatives 2 and 3. The health and reproductive capacity of the horses would be maintained or improved since adequate forage would

Table 3-16 Vegetation Allocation to Wild Horses

Herd Management Plan Numbers [1]	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Lvstk.	Alt. 3 Emphasize Non-Lvstk
Palomino Buttes				
Minimum herd	30	30	15	105
Maximum herd	60	60	30	210
AUMs total use	720	0	360	2,520
Warm Springs				
Minimum herd	100	100	30	546
Maximum herd	200	200	60	1,093
AUMs total use	2,400	0	720	13,115

be allocated to the horses. Under Alternative 1, forage competition would continue. In Alternative 3, eliminating livestock grazing and the associated management activities would remove a major source of forage competition and disturbance to horses. Periodic removal of horses to maintain optimum numbers would cause disturbances under the proposed action and all alternatives. Based on observations of past reductions of the herds and subsequent rates of reproduction, the herd populations would be expected to remain viable.

The proposed grazing systems in the proposed action and Alternative 2 would cause about the same amount of disturbance from livestock operators moving livestock as presently occurs under the existing grazing systems (which would continue under Alternative 1). Grazing systems would not be implemented under Alternative 3.

The design, construction and maintenance of range improvements under the proposed action and Alternative 2 would result in more people being in the herd areas, temporarily disturbing the wild horses with increased activity and noise. The five reservoirs proposed to be constructed under the proposed action and Alternative 2 would be available to horses year-long and thus open up areas of forage previously unavailable to horses because of long distances from water. The 72 miles of fence to be constructed could cause injuries to horses until the horses became accustomed to fence locations. Under Alternative 3, similar impacts due to fence location could occur at the four playas proposed for fencing.

No range improvements would be constructed in the herd management areas under Alternative 1.

IMPACTS ON RECREATION

Impacts on hunting, fishing and other wildlife-associated recreation would be dependent upon impacts to the species sought (see Impacts to Wildlife, this chapter). In some areas, livestock exclusions and riparian habitat protection would enhance fishing, waterfowl and upland game hunting.

Impacts on general sightseeing are related to the effects on scenic quality (see Impacts on Visual Resources, this chapter). Under the proposed action and Alternatives 2 and 3, visual contrasts could cause short-term visitor use reductions due to recreational experience and scenic quality degradation. However, in the long term, sightseeing opportunities and recreational experiences would be enhanced as forage abundance and quality improve.

Range improvement projects which impair access and/or degrade site integrity or recreational experiences would result in site-specific adverse impacts within certain activity areas. Fencing would impede access for some recreationists. The resultant long-term impact would be more an annoyance to recreationists, causing slight localized reductions or relocation of visitor use in some activities (e.g., fishing, hunting, sightseeing). Elsewhere, fencing would stabilize streambanks and improve fishing. Water developments would attract wildlife and enhance hunting and sightseeing opportunities. Unimproved trails and tracks created during project construction would result in improved access for dispersed recreation. These trails and tracks may also create adverse impacts to those recreationists who perceive them as degradatory to natural and pristine rangeland conditions. Alternative 1 would result in no impacts due to new range improvement project construction. The proposed action and Alternatives 2 and 3 would result in low to moderate impacts.

Slight adverse impacts would occur to localized visitor use in four high quality recreation opportunity areas. Access for rock and mineral collecting and sightseeing at Glass Butte would be impaired by 4 miles of fencing under the proposed action and Alternatives 2 and 3. Under the proposed action and Alternative 2, wild horse sightseeing at Palomino Butte would be degraded by fencing (l2 miles) and brush control and seeding (3,400 - 4,600 acres). Three miles of fencing under the proposed action and Alternatives 2 and 3 may adversely affect off-road vehicle use at Radar Hill. Antelope hunting in the area south of Highway 20, and deer hunting north of Highway 20 may be slightly impaired by numerous improvements in those areas.

Some moderate-quality recreation activity areas may be impacted by range improvements. Under the proposed action and Alternatives 2 and 3, range improvements (particularly fencing) may impair access for rock collecting in the Dog Mountain, Skull Creek and Harney Lake areas. Under Alternative 2, access for wild horse viewing at Foster Flats may also be slightly impaired.

Under the proposed action and Alternative 3, sport fisheries would be enhanced along Hay Creek due to livestock exclusion. Under all alternatives, enhanced fishing at Wickiup Creek would result (See Impacts on Fish).

Projected visitor use to 1990 would not be significantly impacted under any alternative. Visitor use reductions would tend to balance increases in visitor use in activities beneficially impacted. Areawide projected use for public lands in the Riley EIS area would show about a 24 percent increase over existing levels (see Table 2-7) for a total of about 148,000 visitor days in 1990. In the long-term, increasing deer populations (proposed action, Alternative 3) and antelope populations (proposed action, Alternatives 2 and 3) would lead to corresponding increases in hunter use.

IMPACTS ON CULTURAL RESOURCES

In accordance with the National Historic Preservation Act of 1966, as amended, Executive Order 11593 and Bureau policy, appropriate measures would be taken to identify and protect cultural sites prior to ground-disturbing activities (see Chapter 1, Standard Procedures and Design Elements for Range Improvements). Therefore, no adverse impacts would occur to known cultural sites of significance.

IMPACTS ON VISUAL RESOURCES

Under the proposed action and all alternatives, no significant impacts to visual resources would result due to vegetation allocation. Under the proposed action and Alternative 2, grazing systems (especially rest rotation and deferred rotation) have the potential to create contrast between grazed and rested pastures in some localized areas. However, the impacts of grazing systems would be minimal as the implementation of visual resource management (VRM) program procedures and constraints would allow for compatibility with the class objectives.

Each type of range improvement was examined to determine the degree of contrast it would create within the typical landscape of the EIS area. Deviations from the characteristic landscape (see Glossary) vary in degree of contrast. Further, some improvements and vegetative manipulation projects would add visually acceptable variety in an otherwise monotonous landscape. No adverse impacts would occur in VRM Class IV areas. Table 3-17 identifies the range improvements under the proposed action and Alternatives 2 and 3 which have the potential to exceed the maximum visual impact consistent with VRM Class II and III lands. Alternative 1 would create no impacts because there would be no range improvements.

Certain portions of the Riley EIS area may experience slight degradation of visual quality. Project design features, as well as VRM program procedures and constraints, would minimize landform and vegetative contrast. In the long term, visual quality would improve as range condition improves.

Table 3-17 Potential Impacts to Visual Resources

VRM CLASS	ALTERNATIVE [1]			ALLOTMENT(S)
	Proposed Action	**2-Emphasize Livestock**	**3-Emphasize Non-Lvstk**	
II	44 miles fence	42 miles fence	44 miles fence	7001, 7003, 7005, 7010, 7016, 7027, 7030
	1 well	1 well	1 well	7003
	4 waterholes	4 waterholes	2 waterholes	7001, 7003
	4 reservoirs	4 reservoirs	4 reservoirs	7003, 7007,7024
	1,582 acres brushcontrol	1,582 acresbrush control		7016
	8,160 acres brush control and seed	10,880 acres brush control and seed		7003
III	3 wells	3 wells	2 wells	7003, 7019, 7020
	1 waterhole	1 waterhole		7001
	25 reservoirs	25 reservoirs	24 reservoirs	7003, 7006, 7007,7008, 7010, 7013, 7014, 7015, 7019, 7020, 7021, 7024, 7025
	1,465 acres brush control	1,465 acres brush control		7006
	4,000 acres seeding	4,000 acres seeding	4,000 acresseeding	7020
	10,897 acres brush control and seed	15,616 acres brush control and seed		7006, 7018, 7019

[1] Alternative 1 would have no potential impacts as a result of range improvements.

IMPACTS ON SPECIAL AREAS

No impacts would occur to the South Narrows potential Area of Critical Environmental Concern (ACEC) or the Section 8 potential Research Natural Area (RNA) under the proposed action or Alternative 3.

Under Alternatives 1 and 2 the South Narrows potential ACEC would not be designated as such, but a livestock exclusion would continue in the 160-acre exclosure for protection of the area's significant resource values.

Under Alternative 1 no impacts would occur to the Section 8 potential RNA as the area would continue to be excluded from livestock grazing. Under Alternative 2, the area would be open to livestock grazing resulting in vegetative disturbance, soil compaction and erosion.

IMPACTS ON SOCIOECONOMIC CONDITIONS

Introduction

The economic impacts of the proposed action and alternatives are expressed in terms of the effects on: dependence on public forage; ranch property values; ranch income and operations; and local income and employment from grazing and the construction of range improvements. No significant impacts on income and employment related to hunting and fishing and other recreational activity have been identified. Social impacts, not primarily economic in nature, are discussed as appropriate. The long term effects of changes in forage availability on individual operators or on herd size classes have not been estimated because the disposition of projected forage increases has not been determined.

Effect on Dependence on Public Forage

In determining the effect on dependence, actual (paid) use in 1980 was subtracted from future allocations based on 1980 active preference in each allotment, and the resultant changes for each operator were converted to a proportion of the operator's forage needs.

Table 3-18 shows how individual operators would be affected in the short term by the alternative actions in terms of their annual forage requirements. The table shows the number of operators in each herd size class classified by whether they would have a loss, no change or a gain in public forage (forage from BLM-administered lands) in terms of their annual forage requirements. Also shown in the table is the average change in forage as a percent of annual requirements. This figure equals the total change in public forage expressed as a percentage of the annual forage needs of all operators' herds combined.

In the short term two operators would experience a loss of forage greater than 10 percent of their annual requirements under the proposed action and Alternatives 1 and 2. Under Alternative 3, 12 operators would lose 10 percent or more of their annual requirements.

The effect of forage losses would be more severe in terms of forage needs at the time the losses occur. Operators with forage losses under Alternative 3 are tabulated in Table 3-19 by the percentage of their month-to-month forage requirements which would be lost.

An operator experiencing a substantial and continuing loss of forage during his period of peak dependency might be forced to sell out. The social impact for the operator and family would probably be severe because of the close connection between the ranching occupation and lifestyle. The intense involvement of the ranch family in the business means a substantial social adjustment in changing livelihoods. A second factor increasing the difficulty of change is the relative isolation from other occupations and lifestyles.

In the long term, changes in forage as a percentage of the annual forage requirements of permittees' existing herds would amount to:

Proposed Action	+13.7%
Alternative 1	+ 6.1%
Alternative 2	+16.4%
Alternative 3	+ 3.3%

The seasonal distribution of public forage use is not expected to change significantly from current patterns.

Effect on Ranch Property Values

The effect on ranch values as collateral for loans or in the sale of the enterprise has been calculated by valuing public forage licenses at $45 per AUM. In the short term, under the proposed action, there would be no change in preference, and consequently, no change in ranch values. Under Alternative 2, no ranch values would be reduced, but some would be increased. Under Alternatives 3, seven ranches would be reduced in value by more than $50 thousand, six by $20-49 thousand, and three by $1-9 thousand.

The effect on ranch values in total for the proposed action and each alternative would be as follows:

Action	Short Term	Long Term
Proposed Action	$-0-	$+944,000
Alternative 1	-0-	-0-
Alternative 2	+58,000	+1,282,000
Alternative 3	-846,000	-347,000

Table 3-18 Number of Operators Affected in Short Term by Change in Public Forage Allocation (Change expressed as percent of annual forage requirements)

Change in forage as percent of annual requirements	Herd Size in Animal Units				All Operators
	Under 100	100-399	400-999	1000+	
PROPOSED ACTION [1]					
Loss over -30.0%	-	-	-	-	-
-20.0 to -29.9%	-	-	-	-	-
-10.0 to -19.9%	1	1	-	-	2
Loss under -10%	-	1	3	-	4
No change	1	10	6	1	18
Gain to 9.9%	1	7	3	4	15
+10.0 to 19.9%	1	3	2	1	7
+20.0 to 29.9%	-	1	-	2	3
+30.0 to 49.9%	1	-	-	-	1
+50.0% or more	1	1	-	-	2
Average change	+16.4%	+6.3%	+4.2%	+7.4%	+6.1%
ALTERNATIVE 2 [1]					
Loss over -30.0%	-	-	-	-	-
-20.0 to -29.9%	-	-	-	-	-
-10.0 to -19.9%	1	1	-	-	2
Loss under -10%	-	1	2	-	3
No change	1	6	1	1	9
Gain to 9.9%	1	11	9	4	25
+10.0 to 19.9%	1	3	2	1	7
+20.0 to 29.9%	-	1	-	2	3
+30.0 to 49.9%	1	-	-	-	1
+50.0% or more	1	1	-	-	2
Average change	+16.4%	+6.9%	+4.9%	+7.6%	+6.6%
ALTERNATIVE 3					
Loss over -30.0%	-	-	3	-	3
-20.0 to -29.9%	-	2	1	-	3
-10.0 to -19.9%	1	2	2	1	6
Loss under -10%	-	3	2	-	5
No change	1	6	1	1	9
Gain to 9.9%	1	7	3	4	15
+10.0 to 19.9%	1	3	2	1	7
+20.0 to 29.9%	-	-	-	1	1
+30.0 to 49.9%	1	-	-	-	1
+50.0% or more	1	1	-	-	2
Average change	+16.4%	+0.1%	-6.8%	+3.7%	-0.7%

[1] Effects of Alternative 1 (No Action) are the same as those for the proposed action.

Table 3-19 Number of Operators with Forage Loss Under Alternative [3] by Size of Loss at Time of Greatest Dependence on BLM Forage

Loss as Percent of Forage Requirements [1]	Herd Size Group Under 100	100-399	400-999	1,000 or more	All Operators
90-100 percent	-	-	1	-	1
80-89 percent	-	-	-	-	-
70-79 percent	-	1	2	-	3
60-69 percent	-	1	-	-	1
50-59 percent	1	1	2	-	4
40-49 percent	-	1	-	-	1
30-39 percent	-	-	1	-	1
20-29 percent	-	-	1	-	1
10-19 percent	-	2	-	1	3
Less than 10 percent	-	1	1	-	2
Total	1	7	8	1	17

[1] Reduction in BLM forage permitted as percentage of total herd needs during the period (1 month or more) of greatest reliance on BLM forage.

Effect on Average Return Above Cash Costs

The effects of average changes in public forage were analyzed by means of linear program models which determined the profit-maximizing business adjustment (Gee 1982). The budgets and results of the analysis are presented in Appendix I.

The average changes in operators' return above cash costs are shown in Table 3-20. These estimates are based on the average change in forage as it would affect the average operator. They, consequently, do not adequately reflect the effects on operators experiencing substantial forage losses under Alternative 3.

Effects of Changes in Public Forage Use on Income and Employment

The effects of the various potential management actions on personal income and employment in the livestock industry and in the community as a whole are shown in Table 3-21.

In the short term under the proposed action and Alternative 1, local income and employment attributable to public forage use would be increased assuming that all active grazing preferences were utilized. Under Alternative 2, slightly larger increases would occur. Losses including some income and a total of seven jobs would be experienced under Alternative 3.

Table 3-20 Effect in Short Term on Return Above Cash Costs [1] (1978-80 average prices)

Herd Size Class	Existing Condition	Proposed Action [2]	Amount of Change Alternative 2	Alternative 3
Under 100 cows	$4,809	$782	$782	$782
100-399 cows	23,964	2,372	2,372	21
400-999 cows	79,062	2,773	3,603	-8,319
1000 or more cows	196,277	17,757	18,207	8,843
All operators	$51,482	$ 4,663	$ 4,956	$-779

[1] See text of Chapter 2 for discussion of return above cash costs. Results of linear program analysis on which table is based shown in Appendix I.
[2] Effects of Alternative 1 (No Action) would be the same as proposed action.

Table 3-21 Effects of Changes in Public Forage on Personal Income and Employment in the Livestock Industry in Harney County [1]
(Income in thousands of dollars, 1978-80 average prices)

Sector	Proposed Action		Alternative 2		Alternative 3	
	Short term	Long term	Short term	Long term	Short term	Long term
Livestock Industry:						
Personal Income	+$154.5	+$363.3	+$167.3	+$438.2	-$ 32.7	+$ 77.7
Employment	+14	+34	+16	+41	-3	+7
Harney County:						
Personal Income	+$342.4	+$805.2	+$370.7	+$971.1	-$72.4	+$172.1
Employment	+33	+78	+ 36	+95	-7	+17

[1] Effects of forage changes were estimated by factors derived from an interindustry model for Harney County (Forest Service Region 6, Implan, 1981). Changes in livestock sales (representing final demand) were estimated at $23.14 per AUM, average sales per AUM in the ranch budget study. The factors used in estimating income and employment as a proportion of final demand (livestock sales) were:

	Livestock industry	Harney County (private sector)
Income	.4304	.9538
Employment	.00004030	.00009294

The effects under Alternative 1 (No Action) would be the same as those for the proposed action - short term condition.

In the long term, increased public forage would generate 78 more local jobs under the proposed action, 95 more jobs under Alternative 2, and 17 more under Alternative 3.

Construction

Table 3-22 shows the effects of construction activity resulting from the alternative actions.

Table 3-22 Effects of Construction on Personal Income and Employment
(Income in thousands of dollars, 1978-80 average prices)

Alternative Action [2]	Construction Costs of Improvements	Personal Income [1]	Employment [1] (work-years)
Proposed Action	$2,367	$1,497	112
Alternative 2	$3,273	$2,069	154
Alternative 3	$1,490	$ 942	70

[1] Income and employment estimated by factors derived from inter-industry models as applied to estimated costs of improvements. Represents total amount generated over the whole construction period.
[2] Alternative 1 would not involve construction activity.

Appendices

Appendices

Appendix A

Summary and Results of EIS Scoping

Public meetings for the purpose of scoping the Riley Grazing Management Environmental Impact Statement (EIS) were combined with the meetings to discuss the development of the preferred alternative for the Riley Management Framework Plan (MFP). The MFP at that stage consisted of three land use allocation alternatives which had been developed from criteria established with earlier public input. The three alternatives called for various allocations of forage for livestock, including one higher and one lower than current active preference.

Alternatives presented in the MFP were discussed in a public meeting at Burns in January 1981. Both oral and written comments were received and used in developing the proposed action and other alternatives to be analyzed in the Riley EIS.

Comments received were about equally split between preferences for the alternative which emphasized enhancement of local economic benefits and the alternative which balanced economic uses with natural and cultural values. With only slight modification, the grazing management elements of the latter were selected by the Area Manager and District Manager as the preferred alternative for the Riley Grazing Management EIS.

No comments suggested inclusion in the EIS of any alternatives other than the grazing management elements of the three MFP alternatives. At the meeting, the possibility of including a "No Grazing" alternative was discussed. The members of the public in attendance were overwhelmingly opposed to its inclusion. The grazing management elements of the MFP alternative with the lowest allocation of forage for livestock would exclude livestock grazing from approximately half of the EIS area. Thus, the Area Manager and District Manager felt that an additional alternative excluding livestock grazing from the entire EIS area would serve no purpose except possibly providing an analytical baseline of sorts with no practical utility to the decisionmaker.

It was concluded that the following alternatives should be analyzed in the EIS

- The proposed action (the preferred alternative; from MFP Alternative B as modified)
- Emphasize livestock grazing (from MFP Alternative A)
- Emphasize non-livestock grazing values (from MFP Alternative C)
- No action (continue the existing situation). This alternative is required by law.

Appendix B, Table B-1 Initial and Long Term Forage Allocations [1]

ALLOT NO.	Proposed Action					Alternative 1 No Action					Alternative 2 Emphasize Livestock					Alternative 3 Emphasize Non-Livestock				
	STLV	LTLV	WL	WH	NC	STLV	LTLV	WL	WH	NC	STLV	LTLV	WL	WH	NC	STLV	LTLV	WL	WH	NC
7001	7,955	10,350	149	960	137	7,955	7,955	149	960	137	8,555	10,950	149	360	137	3,000	3,000	149	5,915	137
7002	10,584	11,641	55	864	9	10,584	10,584	55	864	9	11,088	13,513	55	360	9	400	400	55	6,624	4,433
7003	9,158	16,408	82	0	0	9,158	9,158	82	0	0	9,158	18,720	82	0	0	9,158	13,160	82	0	0
7004	7,493	10,565	55	0	0	7,493	7,493	55	0	0	7,493	12,092	55	0	0	7,493	10,115	55	0	0
7005	972	1,075	16	0	0	972	972	16	0	0	972	1,075	16	0	0	972	1,075	16	0	0
7006	1,775	2,050	17	0	12	1,775	1,775	17	0	12	1,775	2,050	17	0	12	1,775	2,050	17	0	12
7007	2,209	2,550	28	0	0	2,209	2,209	28	0	0	2,209	2,550	28	0	0	2,209	2,550	28	0	0
7008	1,638	2,000	32	0	87	1,638	1,638	32	0	87	1,638	2,000	32	0	87	1,638	2,000	32	0	87
7009	2,884	3,175	52	0	53	2,884	2,884	52	0	53	2,884	3,175	52	0	53	2,884	3,175	52	0	53
7010	2,950	3,250	114	0	91	2,950	2,950	114	0	91	2,950	3,250	114	0	91	2,950	3,250	114	0	91
7011	254	254	2	0	34	254	254	2	0	34	254	254	2	0	34	254	254	2	0	34
7012	316	316	2	0	57	316	316	2	0	57	316	316	2	0	57	316	316	2	0	57
7013	160	200	7	0	0	160	160	7	0	0	160	200	7	0	0	160	200	7	0	0
7014	1,048	1,250	97	0	0	1,048	1,048	97	0	0	1,048	1,250	97	0	0	1,048	1,250	97	0	0
7015	638	704	69	0	0	638	638	69	0	0	638	704	69	0	0	638	704	69	0	0
7016	1,950	2,403	52	0	0	1,950	1,950	52	0	0	1,950	2,454	52	0	0	1,950	2,250	52	0	0
7017	648	675	8	0	0	648	648	8	0	0	648	675	8	0	0	648	675	8	0	0
7018	1,755	2,749	14	0	0	1,755	1,755	14	0	0	1,755	3,049	14	0	0	1,755	2,450	14	0	0
7019	2,762	4,378	406	360	6	2,762	2,762	406	360	6	2,882	5,145	406	240	6	500	500	406	1,560	1,068
7020	300	960	9	0	0	300	300	9	0	0	300	960	9	0	0	300	960	9	0	0
7021	1,396	1,675	31	180	16	1,396	1,396	31	180	16	1,456	1,735	31	120	16	0	0	31	780	812
7022	176	200	5	0	0	176	176	5	0	0	176	200	5	0	0	176	200	5	0	0
7023	1,848	2,025	117	0	0	1,848	1,848	117	0	0	1,848	2,025	117	0	0	1,848	2,025	117	0	0
7024	2,393	2,625	164	0	0	2,393	2,393	164	0	0	2,393	2,625	164	0	0	2,393	2,625	164	0	0
7025	567	621	45	0	2	567	567	45	0	2	567	621	45	0	2	567	621	45	0	2
7026	494	572	17	0	0	494	494	17	0	0	494	572	17	0	0	494	572	17	0	0
7027	112	112	1	0	4	112	112	1	0	4	112	112	1	0	4	112	112	1	0	4
7028	3	3	1	0	0	3	3	1	0	0	3	3	1	0	0	3	3	1	0	0
7029	60	139	13	0	0	60	60	13	0	0	60	139	13	0	0	60	139	13	0	0
7030	2,403	2,775	317	0	28	2,403	2,403	317	0	28	2,403	2,775	317	0	28	2,403	2,775	317	0	28
7031	585	637	25	0	27	585	585	25	0	27	585	637	25	0	27	585	637	25	0	27
7032	26	26	4	0	4	26	26	4	0	4	26	26	4	0	4	26	26	4	0	4
7033	245	274	10	0	0	245	245	10	0	0	245	274	10	0	0	245	274	10	0	0
7034	96	96	7	0	0	96	96	7	0	0	96	96	7	0	0	96	96	7	0	0
7035	159	159	10	0	0	159	159	10	0	0	159	159	10	0	0	159	159	10	0	0
7036	329	400	30	0	0	329	329	30	0	0	329	400	30	0	0	329	400	30	0	0
7037	370	370	26	0	0	370	370	26	0	0	370	370	26	0	0	370	370	26	0	0
7038	72	72	6	0	0	72	72	6	0	0	72	72	6	0	0	72	72	6	0	0
7039	210	250	20	0	0	210	210	20	0	0	210	250	20	0	0	210	250	20	0	0
7040	740	740	32	0	76	740	740	32	0	76	740	740	32	0	76	740	740	32	0	76
7041	594	594	41	0	24	594	594	41	0	24	594	594	41	0	24	594	594	41	0	24
7042	25	25	5	0	0	25	25	5	0	0	25	25	5	0	0	25	25	5	0	0
7043	2,137	2,137	90	0	0	2,137	2,137	90	0	0	2,137	2,137	90	0	0	2,137	2,137	90	0	0
7044	20	20	3	0	0	20	20	3	0	0	20	20	3	0	0	20	20	3	0	0
7045	48	48	9	0	0	48	48	9	0	0	48	48	9	0	0	48	48	9	0	0
7046	20	20	2	0	0	20	20	2	0	0	20	20	2	0	0	20	20	2	0	0
7047	60	60	3	0	0	60	60	3	0	0	60	60	3	0	0	60	60	3	0	0
7048	14	14	2	0	0	14	14	2	0	0	14	14	2	0	0	14	14	2	0	0
7049	592	592	18	0	0	592	592	18	0	0	592	592	18	0	0	592	592	18	0	0
7050	57	57	8	0	0	57	57	8	0	0	57	57	8	0	0	57	57	8	0	0
7051	32	32	0	0	0	32	32	0	0	0	32	32	0	0	0	32	32	0	0	0
7052	6	6	1	0	0	6	6	1	0	0	6	6	1	0	0	6	6	1	0	0
7053	100	100	5	0	0	100	100	5	0	0	100	100	5	0	0	0	0	5	0	100
7054	40	40	6	0	0	40	40	6	0	0	40	40	6	0	0	40	40	6	0	0
7055	16	16	0	0	0	16	16	0	0	0	16	16	0	0	0	16	16	0	0	0
TOTALS	73,494	94,485	2,340	2,364	667	73,494	73,494	2,340	2,364	667	74,778	101,974	2,340	1,080	667	54,497	66,091	2,340	14,879	7,049

Key

STLV-Short Term (Initial) Livestock
LTLV-Long Term Livestock
WL-Wildlife
WH-Wild Horse
NC-Nonconsumptive

[1] Initial and long term allocations to wildlife, wildhorses, and nonconsumptive uses are the same for each alternative.

Appendix B, Table B-2

Existing Forage Condition, Grazing Systems and Period of Use

Allot #	Pasture #	and Name	BLM Acres	Existing Forage Condition Good	Fair	Poor	Unknown	P.A.	Grazing System[1] Alt. 1[2]	Alt. 2	Alt. 3	Maximum Period of Use Existing		Proposed	
7001	01	WEED LAKE	269	0	269	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	02	JACK CREEK	160	0	160	0	0	RR3	RR3	RR3	FFR	401	831	401	831
	03	MAT DAVIES	480	480	0	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	04	REFUGE FIELD	100	100	0	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	05	JACK MTN	160	160	0	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	06	NARROWS FIELD	25	0	25	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	07	JACK MTN EAST	8,041	8,041	0	0	0	RR3	RR3	RR3	EX	401	831	715	331
	08	EAGLES NEST NORTH	4,285	3,285	0	1,000	0	DR1	RR2	DR1	DR1	401	831	401	831
	09	EAGLES NEST MID	3,945	3,945	0	0	0	DR1	RR2	DR1	DR1	401	831	401	831
	10	EAGLES NEST SOUTH	6,015	4,192	0	1,823	0	DR1	RR2	DR1	DR1	401	831	401	831
	11	SODHOUSE FIELDS	3,086	0	3,086	0	0	DF	RR2	DF	DF	401	831	715	331
	12	THE NARROWS	55	0	55	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	13	NATIVE	143,769	66,325	34,294	43,150	0	RR3	RR3	RR3	EX	401	831	410	831
	14	BIG FOOT RES EX	15	5	6	0	4	EX	EX	RR3	EX	410	831	410	831
	15	FOSTER LAKE EX	3,700	0	3,700	0	0	RR3	RR3	RR3	EX	401	831	410	831
	16	S.NARROWS EX	160	0	160	0	0	EX	EX	EX	EX	NO	USE	NO	USE
7002	01	BIG STICK SEEDING	430	430	0	0	0	RR3	SS	DR1	RR3	401	915	401	915
	02	M00N	100	100	0	0	0	FFR	FFR	FFR	FFR	401	915	401	1031
	03	HURLBERT SEEDING	405	405	0	0	0	RR3	SS	DR1	RR3	401	915	401	915
	04	HORSEHEAD SEEDING	2,225	2,225	0	0	0	RR3	SS	DR1	RR3	401	915	401	915
	05	W.WARM SPRINGS	278,969	43,371	158,111	77,487	0	RR3	SS	DR1	EX	401	915	401	930
	06	LAKE ON TRAIL EX	320	0	0	320	0	EX	SS	DR1	EX	401	915	401	915
	07	SEILOFF DIKES EX	60	0	60	0	0	EX	EX	EX	EX	NO	USE	NO	USE
	08	BUZZARD SPRING EX	80	0	0	80	0	EX	SS	DR1	EX	401	915	401	915
7003	01	PETERSON PLACE	322	0	322	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	02	WAGONTIRE MTN	8,456	4,060	4,396	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	03	SOURDOUGH SEEDING	16,493	10,677	5,816	0	0	DR1	DF	DR1	DR1	716	925	401	1031
	04	HORSEHEAD SEEDING	1,280	1,280	0	0	0	DR1	SS	DR1	DR1	401	1031	401	1031
	05	LITTLE SEEDING	2,554	2,554	0	0	0	DR1	DF	DR1	DR1	716	925	401	1031
	06	BIG SEEDING	6,029	6,029	0	0	0	DR1	DF	DR1	DR1	716	925	401	1031
	07	HAY LAKE SEEDING	2,206	0	0	2,206	0	DR1	RR1	DR1	DR1	401	925	401	1031
	08	EAST WAGONTIRE	50,650	0	1,182	49,468	0	DR1	RR1	DR1	DR1	401	925	401	1031
	09	SOUTH WAGONTIRE	70,059	6,527	52,602	10,930	0	DR2	RR1	DR2	DR2	401	925	401	1031
7004	01	OLD ANDERL PLACE	80	0	80	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	02	SHEEP MTN.SEED.	9,190	4,598	4,592	0	0	RR1	SS	RR1	RR1	401	1031	401	1031
	03	S.W.WAGONTIRE	41,240	10,215	18,022	13,003	0	DR2	SS	DR2	DR2	401	1031	401	1031
	04	N.W.WAGONTIRE	16,206	5,115	9,011	2,080	0	RR1	SS	RR1	RR1	401	1031	401	1031
7005	01	GLASS BUTTE	6,973	0	6,973	0	0	DR2	SS	DR2	DR2	401	1031	401	1031
7006	01	RIMROCK LAKE	20,900	0	20,900	0	0	DR2	SS	DR2	DR2	401	1015	401	1015
	02	RIMROCK LAKE EX.	135	0	40	95	0	DR2	SS	DR2	EX	401	1015	401	1015
7007	01	UPPER	8,378	0	8,378	0	0	DR2	DR2	DR2	DR2	416	1031	416	1031
	02	LOWER	8,870	0	8,870	0	0	DR2	DR2	DR2	DR2	416	1031	416	1031
	03	GAP FIELD	860	0	860	0	0	EA	EA	EA	EA	401	416	401	416
	04	CLARK FIELD	105	0	105	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
7008	01	STATE FIELD	400	0	400	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	02	UPPER	4,530	0	4,530	0	0	DR2	DR2	DR2	DR2	430	930	430	930
	03	LOWER	6,111	0	6,111	0	0	DR2	DR2	DR2	DR2	401	930	401	930
	04	SHIELDS	1,521	1,521	0	0	0	RR2	RR2	RR2	RR2	416	531	416	531
7008	05	CECIL LAKE EX	185	0	70	115	0	DR2	DR2	DR2	EX	430	930	430	930
	06	NORDELL LAKE EX	190	0	80	110	0	DR2	DR2	DR2	EX	430	930	430	930
	07	SHEEP LAKE EX	160	0	30	130	0	DR2	DR2	DR2	EX	401	930	401	930
7009	01	DRY LAKE	18,039	0	18,039	0	0	SS	DR2	DR2	DR2	401	1031	401	1031
	02	DRY LAKE EX	140	0	140	0	0	SS	DR2	DR2	EX	401	1031	401	1031
	03	SILVER/NICOLL CR EX	335	335	0	0	0	SS	DR2	DR2	EX	401	1031	401	1031
7010	01	CLAW CREEK	23,255	4,977	18,045	233	0	SS	DR2	DR2	DR2	401	930	401	1031
	02	EGYPT CREEK	42	0	42	0	0	FFR	FFR	FFR	FFR	401	930	401	1031
	03	CLARK FIELD	60	0	60	0	0	FFR	FFR	FFR	FFR	401	930	401	1031
	04	ROUGH/SILVER CR EX	362	320	42	0	0	SS	TEX	DR2	EX	401	930	401	1031
	05	UPPER CLAW CR EX	130	0	130	0	0	SS	TEX	DR2	EX	401	930	401	1031
	06	DAIRY CR EX	118	110	8	0	0	SS	DR2	DR2	EX	401	930	401	1031
	07	SILVER CR EX	247	247	0	0	0	SS	DR2	DR2	EX	401	930	401	1031
	08	LOWER CLAW CR EX	30	0	30	0	0	SS	DR2	DR2	EX	401	930	401	1031
7011	01	UPPER VALLEY	1,275	0	1,275	0	0	FFR	FFR	FFR	FFR	416	831	401	1031
	02	SAWMILL/SILVER CR EX	440	0	440	0	0	FFR	FFR	FFR	EX	416	831	401	1031
	03	LOWER CLAW CR EX	30	0	30	0	0	FFR	FFR	FFR	EX	416	831	401	1031
7012	01	SECTION 8	623	623	0	0	0	EX	EX	DR1	EX	NO	USE	616	815
	02	W. WICKIUP	820	820	0	0	0	DR1	DR1	DR1	DR1	616	815	616	815
	03	WICKIUP CR	224	224	0	0	0	TEX	TEX	TEX	EX	NO	USE	NO	USE
	04	E. WICKIUP	1,324	1,324	0	0	0	DR1	DR1	DR1	DR1	616	815	616	815
7013	01	NORTH	960	960	0	0	0	SS	RR3	RR3	RR3	501	930	501	930
	02	SOUTH	1,280	1,280	0	0	0	SS	RR3	RR3	RR3	501	930	501	930
7014	01	MILLER CNYN SEEDING	445	445	0	0	0	DR1	EA	EA	EA	401	1015	401	430
	02	NATIVE RANGE	10,598	9,460	0	1,138	0	DR1	RR2	RR2	RR2	401	1015	401	630

Appendix B, Table B-2
Existing Forage Condition, Grazing Systems and Period of Use

Allot #	Pasture # and Name	BLM Acres	Existing Forage Condition				Grazing System[1]				Maximum Period of Use			
			Good	Fair	Poor	Unknown	P.A.	Alt. 1[2]	Alt. 2	Alt. 3	Existing		Proposed	
7015	01 FFR	640	640	0	0	0	FFR	FFR	FFR	FFR	401	615	401	1031
	02 NATIVE RANGE	7,641	4,954	2,687	0	0	SS	RR2	RR2	RR2	401	615	401	615
7016	01 JUNIPER RIDGE	19,858	0	19,858	0	0	SS	DR2	DR2	DR2	401	930	401	930
	02 SPRAY	1,910	0	1,910	0	0	SS	DR2	DR2	DR2	401	930	401	930
7017	01 NORTH	1,855	0	1,855	0	0	FFR	FFR	FFR	FFR	325	730	325	730
	02 SEEDING	480	0	480	0	0	FFR	FFR	FFR	FFR	325	730	325	730
	03 RANCH FIELD	1,327	0	1,327	0	0	FFR	FFR	FFR	FFR	325	730	325	730
	04 SOUTH	5,364	0	2,976	2,388	0	SS	EA	EA	EA	325	730	301	430
7018	01 MOON	3,135	3,135	0	0	0	DF	DF	DF	DF	701	831	701	831
	02 DUSENBERRY	1,771	1,771	0	0	0	RR3	DR1	DR1	DR1	401	630	401	630
	03 COYOTE RIM	8,067	0	0	8,067	0	RR2	DR1	DR1	DR1	401	630	401	1031
	04 SILVER LAKE	3,313	0	3,313	0	0	DF	DF	DF	DF	901	1031	901	1031
7019	01 LONE RABBIT	2,435	2,435	0	0	0	RR3	DR1	DR1	DR1	401	930	401	1031
	02 GRASSY BUTTE SEEDING	15,261	0	2,580	12,681	0	DR1	DR1	DR1	EX	401	930	401	1031
	03 PALOMINO BUTTES	29,588	19,633	9,955	0	0	DR1	DR1	DR1	EX	401	930	401	1031
	04 W. CHAIN LAKE	122	0	122	0	0	DR1	DR1	DR1	EX	401	930	401	1031
7020	01 NATIVE RANGE	10,168	0	10,168	0	0	SS	DR2	DR2	DR2	415	930	401	1031
	02 SEEDING	4,480	0	4,480	0	0	SS	DR1	DR1	DR1	415	930	401	1031
7021	01 WEAVER LAKE	22,393	0	22,393	0	0	RR3	RR3	RR3	EX	401	930	401	1031
	02 EAST CHAIN EX	250	0	250	0	0	RR3	EX	RR3	EX	401	930	401	1031
7022	01 DOG MTN	5,120	0	0	5,120	0	SS	RR2	RR2	RR2	501	815	501	815
7023	01 WEST	6,457	2,157	4,300	0	0	DR2	DR2	DR2	DR2	401	1031	401	1031
	02 EAST	6,044	2,560	3,484	0	0	DR2	DR2	DR2	DR2	401	1031	401	1031
7024	01 WILLOW FLAT	170	0	170	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	02 SAGEHEN	10,617	1,944	7,009	1,664	0	DR2	DR2	DR2	DR2	401	1031	401	1031
7024	03 WILLOW CREEK	11,502	1,114	9,551	837	0	DR2	DR2	DR2	DR2	401	1031	401	1031
	04 HARDING FIELD	162	0	162	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
7025	01 GOULDIN	4,051	0	4,051	0	0	SS	RR2	RR2	RR2	416	1015	401	831
	02 RADAR HILL EX	40	0	0	40	0	SS	EX	EX	EX	416	1015	NO	USE
7026	01 HORTON MILL	575	575	0	0	0	RR1	RR1	RR1	RR1	416	831	416	831
	02 SHOEFFER RES	1,115	0	1,115	0	0	RR1	RR1	RR1	RR1	416	831	416	831
	03 APPLING-WALTER	1,190	0	1,190	0	0	RR1	RR1	RR1	RR1	416	831	416	831
7027	01 SOUTH	45	45	0	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	02 NORTH	150	150	0	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	03 W. EMIGRANT CR EX	30	1	29	0	0	FFR	FFR	FFR	EX	401	1031	401	1031
7028	01 STINGER CREEK	50	50	0	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
7029	01 CRICKET-EMIGRANT	1,509	1,509	0	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
7030	01 WILLOW FLAT	753	0	753	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	02 EARLY TURNOUT	5,685	0	5,685	0	0	EA	EA	EA	EA	421	430	421	430
	03 B00NE CNYN	20	0	20	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	04 LAKE CREEK	9,365	0	9,365	0	0	DR2	DR2	DR2	DR2	501	1011	505	1011
	05 BASSOUT CABIN	180	0	180	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	06 CAMPBELL PLACE	200	0	200	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	07 BOULDER SPRING	10,237	0	10,237	0	0	DR2	DR2	DR2	DR2	505	1011	505	1011
	08 BASSOUT FIELD	155	0	155	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	09 GREENSPOT EX	10	0	0	5	5	DR2	EX	EA	EX	505	1011	421	430
	10 STATE RES EX	15	0	10	0	5	DR2	EX	DR2	EX	505	1011	505	1011
	11 SKULL CR EX	200	178	22	0	0	DR2	DR2	DR2	EX	505	1011	505	1011
	12 WILLOW RES EX	40	0	28	0	12	DR2	DR2	DR2	EX	505	1011	505	1011
7031	01 WEST TABLE	2,055	2,055	0	0	0	DR1	DR1	DR1	DR1	601	930	601	930
	02 EAST TABLE	3,334	3,334	0	0	0	SS	SS	SS	SS	601	930	601	930
	03 HAY CREEK RANCH	230	230	0	0	0	FFR	FFR	FFR	FFR	501	531	401	1031
	04 HAY CREEK EX	70	0	70	0	0	FFR	EX	FFR	EX	601	930	601	930
	05 E. EMIGRANT CR EX	65	0	65	0	0	DR1	DR1	DR1	EX	601	930	601	930
7032	01 HOTCHKISS	375	0	375	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
	02 L. SKULL CR EX	40	38	2	0	0	FFR	FFR	FFR	EX	401	1031	401	1031
7033	01 PLATEAU	572	572	0	0	0	DF	DF	DF	DF	716	1130	716	1130
	02 FEDERAL	245	0	245	0	0	DR2	DR2	DR2	EX	401	1130	401	1130
	03 RIVER	102	102	0	0	0	DR2	DR2	DR2	DR2	401	1130	401	1130
	04 MEADOW	120	120	0	0	0	DF	DF	DF	DF	1001	228	1001	228
	05 BAKER RANCH	5	5	0	0	0	FFR	FFR	FFR	FFR	401	1130	401	1130
7034	01 SCAT FIELD	837	837	0	0	0	FFR	FFR	FFR	FFR	401	1130	401	1031
7035	01 SILVIES MDW	1,356	1,356	0	0	0	DF	DF	DF	DF	701	1031	701	1031
7036	01 HAYES	5,490	5,490	0	0	0	SS	DR1	DR1	DR1	401	715	401	715
	02 CUSTODIAL	20	20	0	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
7037	01 COAL PIT SPRINGS	2,895	2,895	0	0	0	RR1	RR1	RR1	RR1	501	831	501	831
7038	01 CURRY GORDON	729	0	729	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
7039	01 CAVE GULCH	2,004	2,004	0	0	0	RR2	DR1	DR1	DR1	501	731	401	930
7040	01 LANDING CREEK	3,114	0	3,114	0	0	RR2	RR2	RR2	RR2	401	531	401	531
	02 LANDING CREEK EX	500	500	0	0	0	RR2	RR2	RR2	EX	401	531	401	531
7041	01 RED LICK	2,391	2,391	0	0	0	RR1	RR1	RR1	RR1	601	930	601	930
	02 STANDARD PARALLEL	469	469	0	0	0	RR1	RR1	RR1	RR1	601	930	601	930
	03 WEIGAND	1,234	1,234	0	0	0	SS	SS	SS	SS	601	630	601	630
	04 L. LANDING CR EX	200	200	0	0	0	SS	SS	SS	EX	601	630	601	630
7042	01 DOLE SMITH	445	445	0	0	0	DR1	RR1	RR1	RR1	401	930	601	930
7043	01 WEST MOSQUITO	925	925	0	0	0	RR3	RR3	RR3	RR3	516	531	516	531
	02 EAST MOSQUITO	1,030	1,030	0	0	0	RR3	RR3	RR3	RR3	516	531	516	531
	03 MAHOGANY RIDGE	245	0	245	0	0	EA	EA	EA	EA	515	519	515	519
	04 MUD SPRING	6,346	0	6,346	0	0	RR3	RR3	RR3	RR3	401	515	401	515
	05 GRAVEL RIDGE	6,585	0	6,585	0	0	RR3	RR3	RR3	RR3	401	515	401	515
7044	01 COWING	260	260	0	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
7045	01 WHITING	399	399	0	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
7046	01 BAKER HILL FIELD	188	188	0	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
7047	01 PEABODY	268	268	0	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
7048	01 VARIEN CNYN	317	0	317	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
7049	01 FORKS OF POISON CR	2,879	0	2,879	0	0	RR1	RR1	RR1	RR1	416	930	416	930
7050	01 CLEMENS	466	466	0	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
7051	01 SAWTOOTH MNF	535	535	0	0	0	FFR	FFR	FFR	FFR	601	610	601	610
7052	01 LONE PINE FIELD	160	0	160	0	0	FFR	FFR	FFR	FFR	401	1031	401	1031
7053	01 SILVIES CNYN	925	925	0	0	0	DF	DF	DF	EX	901	930	901	930
7054	01 CRICKET CREEK	970	970	0	0	0	FFR	FFR	FFR	FFR	501	1031	401	1031
7055	01 HOOVER FIELDS	419	419	0	0	0	FFR	FFR	FFR	FFR	901	930	401	1031

[1] Grazing system abbreviations are as follows: EA-spring; SS-spring/summer; DF-deferred; DR1-annual deferred rotation; DR2-biannual deferred rotation; RR1-three pasture rest rotation; RR2-two pasture biannual rest rotation; RR3-two pasture annual rest rotation; EX-exclusion; TEX-temporary exclusion; FFR-fenced federal range.

[2] Alternative 1 grazing system is the same as existing system.

Appendix B, Table B-3 Proposed Range Improvements

Allot No	Proposed Action								Alt. 2 Emphasize Livestock								Alt. 3 Emphasize Non-Livestock							
	Miles Fence	Spring Dev	Miles Pipe	Wells	Reser-voirs	Wat. Holes	Brctl/ Seed	Brctl Only	Miles Fence	Spring Dev	Miles Pipe	Wells	Reser-voirs	Wat. Holes	Brctl/ Seed	Brctl Only	Miles Fench	Spring Dev	Miles Pipe	Wells	Reser-voirs	Wat. Hole	Brctl/ Seed	Brctl Only
7001	17	0	2	0	0	3	0	0	17	0	2	0	0	3	0	0	24	0	2	0	0	0	0	0
7002	5	0	0	0	2	11	0	0	75	0	0	0	2	11	6,548	0	5	0	0	0	0	0	0	0
7003	49	1	35	2	2	6	31,200	1,465	49	1	35	2	2	6	41,600	1,465	30	1	20	1	2	6	11,286	0
7004	17	0	7	1	2	0	11,031	0	17	0	7	1	2	0	14,708	0	17	0	4	0	2	0	5,178	0
7005	4	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
7006	4	0	0	0	2	0	0	0	4	0	0	0	2	0	0	0	6	0	0	0	2	0	0	0
7007	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	0
7008	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	0	5	0	0	0	6	0	0	0
7009	8	0	0	0	2	0	0	0	8	0	0	0	2	0	0	0	12	0	0	0	2	0	0	0
7010	7	0	0	0	4	0	0	0	1	0	0	0	4	0	0	0	13	0	0	0	4	0	0	0
7011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
7012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7013	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0
7014	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0
7015	3	2	0	0	2	0	0	0	3	2	0	0	2	0	0	0	3	2	0	0	2	0	0	0
7016	9	0	1	0	0	0	0	1,146	9	0	1	0	0	0	0	1,528	5	0	0	0	0	0	0	0
7017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7018	1	0	4	0	0	3	4,497	0	1	0	4	0	0	3	5,996	0	1	0	4	0	0	3	2,998	0
7019	17	0	8	1	1	0	4,975	0	17	0	8	1	1	0	7,960	0	5	0	0	0	0	0	0	0
7020	8	0	5	1	1	0	4,000[2]	0	8	0	5	1	1	0	4,000[2]	0	8	5	5	1	1	0	4,000[2]	0
7021	2	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0
7022	8	0	0	0	1	0	0	0	8	0	0	0	1	0	0	0	8	0	0	0	1	0	0	0
7023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7024	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0
7025	4	0	0	0	1	0	0	0	4	0	0	0	1	0	0	0	4	0	0	0	1	0	0	0
7026	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7027	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
7028	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7029	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7030	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0
7031	4	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	6	0	0	0	2	0	0	0
7032	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
7033	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7034	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7035	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7036	4	0	0	0	2	0	0	0	4	0	0	0	2	0	0	0	4	0	0	0	2	0	0	0
7037	0	2	0	0	1	0	0	0	0	2	0	0	1	0	0	0	0	2	0	0	1	0	0	0
7038	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7039	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
7041	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	2	1	0	0	1	0	0	0
7042	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
7043	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7044	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7045	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7046	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7048	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7049	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7050	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7051	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7052	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7053	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7054	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7055	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Totals	176	62	5	104		10	55,703	2,611	232	8	62	5	43	23	80,812	2,993	180	13	35	2	40	9	19,462	0

[1] No range improvements are proposed under Alternative 1, No Action.
[2] Allotment 7020 would include 4,000 acres of seeding without brush control.

Appendix C
Determination of Forage Production and Vegetation Allocation

Determination of Present Forage Production

Forage production for the EIS area was originally determined using the Weight Estimate Method (BLM Manual 4412.11B) between the years 1952 - 1962. Estimated forage condition has been compared with recent levels of use by cattle, horses and wildlife to further refine the estimation of forage production.

Determination of Initial Allocations

The existing livestock forage production is proposed for allocation among livestock, wildlife, wild horses and nonconsumptive uses. Proposed allocations were designed to be consistent with the goals and objectives of the land use alternatives as presented in the Riley Planning Unit Summary of Proposed Land Use Alternatives brochure published in December 1981.

Wild horse forage allocations are based on population objectives set forth in the above brochure. The proposed allocation would satisfy the forage requirement of the planned maximum number of adult horses (which varies by alternative) occupying the area of use. The area of use most preferred by horses is also used by livestock. The proposed allocations show the amount of competitive forage which would be used by livestock or horses but could be used by each within these areas of use. The areas which are least preferred by horses are in areas which are unsuitable for livestock due to a lack of available water or steep terrain. No allocations are proposed in these areas; however, under the proposed action and Alternatives 1 and 3 the higher population of horses would result in noncompetitive use of forage by horses in these least preferred areas.

Oregon Department of Fish and Wildlife (ODFW) supplied big game numbers and season of use. Only competitive livestock AUMs were formally allocated to big game. Thus, only a portion of the big game's total diet is formally allocated. A competitive AUM is forage composed of palatable shrubs, grasses and forbs eaten by both livestock and wildlife. The portion of total big game forage which is competitive is based on the dietary overlap or percentage of competion by deer or antelope. Dietary overlap is 10 percent for antelope and 18 percent for deer.

Big game unit months were converted to AUMs using the following conversion ratios:

5.3 Deer Unit Months = 1 AUM
7 Antelope Unit Months = 1 AUM

Big game was allocated forage in proportion to the percent of public land in the allotment. A mathematical equation illustrates the method used to derive wildlife AUMs.

Deer	Months	1 AUM	% Dietary		Wildlife
x	of x	x	% BLM	x	= AUM
Nos.	Use	5.3	Overlap		Allocation

The same formula with the 7:1 AUM conversion factors was used for antelope.

Nonconsumptive allocations are made in order to quantify the amount of livestock forage which could be consumed in areas which are proposed for livestock exclusion. No adjustments in proposed livestock allocation were made in allotments with non-consumptive allocations because it is estimated that the amount of use which would occur by livestock in the exclusion areas would be replaced by forage in other parts of the allotment. The assumption is that the estimates of grazing capacity are conservative enough to allow fencing of preferred use areas, such as riparian areas, without proportional reductions in livestock allocations.

Determination of Future Forage Production

The analysis of predicted changes in grazing capacity is based on the expected change in key species composition and vegetative production. These changes would occur as a result of changes in livestock distribution provided by water developments, timing and intensity of livestock grazing, and the conversion of shrub plant communities to perennial bunchgrass plant communities.

In Allotment 7003 for example, the implementation of deferred rotation grazing on approximately 150,000 acres and the construction of 11 water developments would result in improved livestock distribution and periodic rest. Forage production would increase, accounting for an estimated increase of 942 AUMs. Vegetative manipulation on 43,065 acres would result in an additional 6,308 AUMs of forage production. Ten years following implementation, the forage production of the allotment is thus expected to increase by 7,250 AUMs. Added to the current production of 9,240 AUMs, the future forage production of the allotment would be approximately 16,490 AUMs.

Determination of Long-Term Allocations

The determination of the long-term allocation uses the same methodology as the short-term allocation. The long-term allocation is for analysis purposes only. The actual allocation will be made only as forage becomes available and in line with multiple use resource objectives of future resource management plans.

Appendix D

Scientific Names of Plants Mentioned in the EIS

alder	**Alnus ssp.**
aster	**Aster ssp.**
basin wildrye	**Elymus cinereus**
big sagebrush	**Artemisia tridentata**
bitterbrush	**Purshia tridentata**
bluebunch wheatgrass	**Agropyron spicatum**
buckwheat	**Eriogonum spp.**
bulrush	**Scirpus spp.**
ceanothus	**Ceanothus spp.**
cheatgrass	**Bromus tectorum**
chokecherry	**Prunus virginiana**
creek dogwood	**Cornus stolonifera**
creeping wildrye	**Elymus triticoides**
crested wheatgrass	**Agropyron cristatum**
currant	**Ribes spp.**
dock	**Rumex spp.**
greasewood	**Sarcobatus vermiculatus**
hopsage	**Atriplex spinosa**
Idaho fescue	**Festuca idahoensis**
junegrass	**Koeleria cristata**
juniper	**Juniperus occidentalis**
Kentucky bluegrass	**Poa pratensis**
knotweed	**Polygonum spp.**
low sagebrush	**Artemisia arbuscula**
manzanita	**Manzanita spp.**
mat muhly	**Muhlenbergia richardsonis**
mountain mahogany	**Cercocarpus ledifolius**
needlegrass	**Stipa spp.**
phlox	**Phlox spp.**
ponderosa pine	**Pinus ponderosa**
pondweed	**Potamogeton spp.**
poverty weed	**Iva axillaris**
quaking aspen	**Populus tremuloides**
rabbitbrush	**Chrysothamnus spp.**
rush	**Juncus spp.**
saltgrass	**Distichlis spp.**
Sandberg bluegrass	**Poa sandbergii**
sedge	**Carex spp.**
shadscale	**Atriplex confertifolia**
silver sagebrush	**Artemisia cana**
spiney hopsage	**Grayia spinosa**
squirreltail	**Sitanion hystrix**
smartweed	**Polygonum spp.**
Thurber's needlegrass	**Stipa thurberiana**
timothy	**Phleum pratense**
willow	**Salix spp.**
yarrow	**Achillea millefolium**

Appendix E

Determination of Existing and Predicted Forage Condition and Trend

Determination of Existing Forage Conditions

The determination of existing condition was based on the percentage of desirable and intermediate forage species present. Ecological condition for the EIS area has not been determined. Species composition percentages were estimated by field personnel and were spot checked during field inspections in 1979 and 1980. Average forage condition by pasture may not reflect the condition of livestock concentration areas or areas which receive little or no use.

Good condition range has a species composition of 40 percent or more desirable or intermediate species with at least 20 percent made up of desirable. In the Riley EIS area, desirable species include crested wheatgrass, bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue, basin wildrye, squirreltail, bitterbrush, aspen and willow. Intermediate species include Sandbergs bluegrass, low sagebrush and greasewood.

Fair condition range has a species composition of 15 to 39 percent desirable or intermediate species with at least 5 percent made up of desirable species or at least 60 percent intermediate species.

Poor condition range has a species composition which has less than 15 percent desirable and intermediate species or the range has critical to severe erosion.

Determination of Predicted Forage Condition

The determinations of predicted condition are based on the discussion of vegetation allocation and grazing systems in Chapter 3. Variables such as large year-to-year fluctuations in precipitation make a precise quantification of impacts to vegetation impossible. The impact analysis methodology, therefore, produces a result which is most useful as a relative comparison between alternatives rather than as an absolute prediction of the impacts of implementing any one alternative.

The following analysis of impacts to forage condition on Allotment 7017 illustrates how the components of the proposed action and alternatives resulted in the long-term forage conditions shown in Table 3-1. The majority of the allotment is currently managed as a fenced federal range and would continue as such. One pasture, however, is currently managed under a spring/summer system with use dates of March 25 to July 30. This pasture currently has 2,976 acres in fair condition and 2,388 acres in poor condition.

Under the proposed action, this pasture would be grazed under a spring grazing system with use from April 1 to April 30 only. Livestock would be removed before the critical part of the growing period. The existing key species would have enhanced vigor demonstrated by an increase in production of seedstalks and vegetative growth. At the end of 15 years all of the fair condition range would be rated good. Although some improvement of the poor condition range would occur, it is not expected to be enough to give the acres a fair rating.

Appendix F
Properties and Qualities of the Soils in the Riley EIS Area

Soil Unit	Narrative Soil Divisions[1]	Classification Subgroup—Family	Slope Gradient (percent)	Bedrock or Underlying Material	Perma-bility	Effective Root Depth (in)	Available Water Holding Capacity
1	B-2	Xerollic Camborthid — Coarse-silty, mixed, mesic	0-3	Alluvium	Mod.	60+	High
6	B-1	Xerollic Torriorthent--Coarse-loamy, mixed, noncalcareous, frigid	0-3	Alluvium	Rapid	60+	Mod.
10	B-2	Cumulic Haplaquoll--Fine-silty, mixed, calcareous, mesic	0-3	Alluvium	Mod.	60+	High
11	B-2	Histic Haplaquoll--Fine-silty, mixed, noncalcareous, mesic	0-3	Alluvium	M. Slow	30-40	Mod.
12	B-2	Histic Haplaquoll--Fine, montmorillonitic, noncalcareous, mesic	0-3	Alluvium	Slow	20-40	Mod.
13	B-2	Fluventic Haplaquoll--Fine-silty, mixed, calcareous, mesic	0-3	Alluvium	Mod.	20-40	Mod.
15	B-2	Cumulic Haplaquoll--Fine-silty, mixed, noncalcareous, mesic	0-3	Alluvium	Mod.	60+	High
25	B-2	Xerollic Paleargid--Clayey, montmorillonitic, frigid, shallow	0-3	Lacustrine	Slow	15-24	Low
26	B-2	Xerollic Camborthid--Loamy, mixed, frigid, shallow	0-3	Lacustrine	Mod.	15-24	Low
30	B-2	Typic Pelloxerert--Montmorillonitic, frigid	0-3	Alluvium	V. Slow	20-40	Mod.
42	B-2	Typic Natraquoll--Fine, montmorillonitic, calcareous, mesic	0-3	Alluvium	V. Slow	20-30	Mod.
43	B-2	Fluventic Haplaquept--Coarse-silty, mixed, calcareous, mesic	0-3	Alluvium	M. Slow	60+	Mod.
44	B-2	Xerollic Natrargid--Fine-silty, mixed, mesic	0-3	Lacustrine	M. Slow	60+	Mod.
45	B-2	Aquic Durorthid--Coarse-silty, mixed, mesic	0-3	Alluvium	V. Slow	20-40	Mod.
50	B-1	Xerollic Durorthid--Coarse-loamy, mixed, mesic	0-12	Alluvium	Slow	10-20	Low
51	B-1	Xerollic Camborthid--Coarse-loamy, mixed, mesic	0-12	Alluvium	M. Rapid	60+	Mod
53	B-2	Xerollic Durargid--Fine-loamy, mixed, mesic	0-12	Lacustrine	Slow	10-20	Low
55	B-2	Xerollic Durargid--Fine-loamy, mixed, mesic	3-12	Alluvium	Slow	10-20	Low
56	B-2	Xerollic Durargid--Fine, montmorillonitic, mesic	3-7	Alluvium	Slow	10-20	Low
74	U-1	Lithic Xerollic Camborthid--Loamy, mixed, frigid	3-60	Volcanic	Rapid	10-20	Low
75	U-1	Lithic Xerollic Haplargid--Loamy, mixed, frigid	30-60	Volcanic	Mod.	10-20	Low
S75	U-2	Lithic Xerollic Haplargid--Loamy-skeletal, mixed, frigid	3-35	Volcanic	Mod.	10-20	Low
76	U-1	Lithic Xerollic Paleargid--Clayey, montmorillonitic, frigid	3-20	Volcanic	M. Slow	10-20	Low
S76	U-2	Lithic Xerollic Paleargid--Clayey-skeletal, montmorillonitic, frigid	3-20	Volcanic	Slow	10-20	Low
77	U-2	Lithic Torriorthent--Loamy, mixed, frigid	3-60	Volcanic	Mod.	5-10	V. Low
78	U-1	Lithic Xeric Torriorthent--Sandy-skeletal, mixed, frigid	7-12	Volcanic	Rapid	10-20	V. Low
79	U-1	Xerollic Camborthid--Fine-loamy, mixed, mesic	3-12	Eolian	Mod.	60+	High
82	U-1	Pachic Cryoboroll--Fine-loamy, mixed	3-60	Volcanic	Mod.	20-40	Mod.
83	U-1	Argic Lithic Cryoboroll--Loamy, mixed	12-60	Volcanic	M. Slow	10-20	Low
84	U-2	Lithic Cryoboroll--Loamy, mixed	3-60	Volcanic	Mod.	5-10	V. Low
86	U-1	Ultic Haploxeroll--Loamy-skeletal, mixed, frigid	0-12+	Volcanic	Mod.	20-40	Low
95	B-1	(Sand dunes)	0-20	Sand	V. Rapid	60+	V. Low
96	U-2	(Rockland)	20-60	Volcanic	Vari.	Vari.	Vari.
97	B-2	(Playas)	0-3	Sed.	Vari.	Vari.	Vari.
98	B-2	(Soft raw sediments, steep)	20-60	Lacustrine	Vari.	Vari.	Vari.

[1] B-1 Basin Land and Terrace -- Sandy (occurs on 10 percent of the EIS area)
B-2 Basin Land and Terrace -- Loamy to clayey, deep (occurs on 20 percent of the EIS area)
U-1 Upland -- Loamy to clayey, shallow, stony (occurs on 40 percent of the EIS area)
U-2 Upland -- Loamy to clayey, very shallow and/or very stony (occurs on 30 percent of the EIS area)

Note: M = moderately
V = very

Source: Norgren et al. 1969; Lindsay et al. 1969; Lovell et al. 1969.

Appendix G
Riparian Inventory

Methods

During the summer of 1979 BLM personnel collected field data from riparian areas along public streams in the Burns District. Some of the data included: miles of stream, acres of riparian habitat, plant utilization, specis composition (particularly trees and shrubs), type of plant community, understory vegetation, percent cover, slope, height categories of trees and wildlife observations. A narrative for each stream segment describes livestock and wildlife impacts, stream channel damage, recreational use, plant reproduction, apparent habitat trend and management recommendations. Photographs were taken at most stream segments.

Rating System

Condition of habitat for wildlife was rated as excellent, good, fair or poor. As with any rating system, the selection of condition classes is subjective and reflects the biologists professional opinion. Habitat potential was an important factor in rating condition. Sparsely vegetated areas which once supported dense growths of trees, shrubs and grasses would be rated poor or fair. Positive and negative factors affecting wildlife were listed to help make condition class selection.

Appendix H

Criteria for Evaluating Stream Conditions

Stream fisheries habitat condition ratings were based on many factors. Key factors included: the percent of the stream shaded; vegetation species composition, vigor and abundance; the intensity of livestock grazing use within the riparian zone; presence of dead trees and shrubs; streambanks stability; gullying; spawning gravel quality and quantity; sedimentation of pools; pool size and depth; the amount and composition of riffles; the pool: riffle ratio; presence and forms of instream fish cover; and water temperatures. Other factors included water turbidity, the amount of stream meandering, abundance of aquatic invertebrates, stream gradient, barriers to upstream fish movement, species composition of fish, fish size, presence of game fish fry, fingerlings and adults, and the relative abundance of game fish as related to the size of the stream.

Characteristics of Condition Ratings

Excellent Condition

Shading streambank cover exceeds 50 percent; all species vigorous with a mixture of age classes; more than 90 percent of streambanks stable; spawning gravel clean; water temperatures rarely exceed 74 F during midday during the summer; trout more abundant than nongame fish species.

Good

Shading streambank cover and understory species reduced from excellent condition habitat; more than 80 percent of streambanks stable; spawning gravel may have slight siltation; water temperatures may exceed 74° F at mid-day 10 percent of the days during the summer; trout more abundant than nongame fish species.

Fair

Shading streambank cover less than 20 percent; many streambanks are unstable with little vegetative healing of eroded banks; spawning gravel somewhat silty and showing signs of compaction; instream cover sparse; nongame fish species more abundant than trout.

Poor

Typical riparian plant species missing or sparse; shading streambank cover commonly 0 to 10 percent; most erodible banks unstable with almost no healing by vegetation; spawning gravel absent and/or silty; shallow pools; water temperatures often exceed 78° F at midday during the summer; instream cover generally lacking; algae mats are the primary instream escape cover for trout; species composition predominantly nongame fish.

The effects of the factors are synergistic and must be considered in combination rather than separately. Therefore the final habitat condition rating was arrived at using professional judgment with no one factor dominating. A simplified picture of this process can be obtained by assigning each factor a numerical value according to its individual rating (e.g., poor = 1, fair = 2, good = 3 and excellent = 4). The numerical values for all factors are then summed and the total reflects the overall habitat condition.

Criteria for Evaluating Reservoir/Lake Conditions

The reservoir/lake habitat condition was obtained by rating key factors as shown in the following table.

	Rating			
Key Factors	**Poor**	**Fair**	**Good**	**Excellent**
Percent of shoreline vegetated	<25	25-75	75-90	>90
Depth of water	<8′	8′-10′	10′-15′	>15′
Adequacy of water supply	Poor	Fair	Good	Excellent
Clarity of water	<1′	2′	3′	4′
(depth at which light colored object visible)				
Percent of water surface cover by aquatic vegetation	>25	15-25	10-15	10
Water Quality	Poor	Fair	Good	Excellent

Appendix I
Ranch Budgets: Linear Programming Process

A survey of ranchers using public forage in Harney County was conducted by the Economics and Statistics Service of the Department of Agriculture in cooperation with the Oregon State University Agricultural Extension Service, and representative budgets were constructed for cow-calf operations based on typical feed-buying patterns, public forage use, pasture and hay land use, use of supplemental protein, fuel, hired labor, and other factors of production (Gee 1982). These budgets represent an average operation in each herd size class, but may differ substantially from any one of the operations which they represent. The value of sales was based on average price in each sales category for the 1978-80 period. Items of costs were valued in the best judgment of the analysts using local data where available. The data were used to construct a simulated profit maximization operation termed a linear programming model. For a description of linear programming, see William J. Baumol, Economic Theory and Operations Analysis, 1972.

The model optimizes the return above cash cost for the rancher taking into account the produced feed and forage resources and other physical limitations of the operation and price constraints. The model incorporates the influence of seasonal variations in the availability of public forage, the nutrient content of forage, and capacity limitations such as feed or rangeland availability.

Table I-1 shows the ranch budgets developed for each herd size class. Table I-2 shows the results of the linear program analysis.

Table I-1 Costs and Returns for Livestock Operators by Herd Size [1]

	Under 100 Cows [2]		100-399 Cows [3]		400-999 Cows [4]		1,000 or More Cows [5]	
Livestock Sales Quantity	**Number**	**Av. Weight**	**Number**	**Av. Weight**	**Number**	**Av. Weight**	**Number**	**Av. Weight**
Steer calves	10	415	55	415	126	415	263	415
Heifer calves	5	370	26	370	84	370	180	370
Yearling steers	5	715	29	715	103	715	214	715
Yearling heifers	3	610	20	610	41	610	80	610
Cull cows	6	940	22	940	87	940	182	940
Livestock Sales Value	**Price/Cwt.**	**Value**	**Price/Cwt.**	**Value**	**Price/Cwt.**	**Value**	**Price/Cwt.**	**Value**
Steer calves	**80.08**	3,323	80.08	18,278	80.08	41,874	80.08	87,403
Heifer calves	**70.05**	1,304	66.17	6,366	70.50	21,911	70.50	46,953
Yearling steers	**67.33**	2,407	67.33	13,961	67.33	49,585	65.58	100,344
Yearling heifers	**61.25**	1,121	61.25	7,473	61.25	15,319	61.13	29,831
Cull cows	**41.27**	2,328	41.27	12,414	41.27	33,751	41.03	70,194
Total		10,483		58,492		162,440		334,725
Total/cow		275.87		273.33		280.55		277.09
Cash Costs	**Total Amt.**	**Amt./Cow**	**Total Amt.**	**Amt./Cow**	**Total Amt.**	**Amt./Cow**	**Total Amt.**	**Amt./Cow**
BLM grazing fee	175	4.60	1,121	5.24	4,489	7.75	6,582	5.45
Forest grazing fee	36	.95	337	1.58	713	1.23	2,032	1.68
Private range lease/rent	66	1.74	713	3.33	6,013	10.38	6,085	5.04
State lease	6	.15	228	1.07	192	.33	564	.47
Hay (produce)	1,474	38.78	7,431	34.73	13,193	22.79	12,980	10.75
Hay (purchase)	--	--	451	2.11	5,538	9.56	--	--
Protein supplement	--	--	--	--	--	--	--	--
Irrigated pasture	72	1.89	691	3.23	2,413	4.17	1,716	1.42
Salt and mineral	78	2.06	431	2.01	1,105	1.91	2,425	2.01
Concentrate feeds	--	--	--	--	--	--	--	--
Veterinary and medicine	240	6.32	1,320	6.17	2,989	5.16	6,484	5.37
Hired trucking	149	3.92	822	3.84	884	1.53	765	.63
Marketing	64	1.68	353	1.65	284	.49	1,784	1.48
Fuel and lubricants	455	11.96	2,293	10.71	4,205	7.26	6,244	5.17
Repairs	477	12.56	2,237	10.46	4,280	7.39	10,057	8.33
Taxes	1,458	38.28	6,922	32.34	15,176	25.21	33,035	27.35
Insurance	259	6.55	1,267	5.92	3,305	5.71	6,893	5.71
Interest on operating capital	317	8.34	1,988	9.29	4,710	8.13	5,785	4.79
General farm overhead	358	9.42	1,971	9.21	3,745	6.47	8,836	7.31
Other cash costs	--	--	--	--	--	--	--	--
Hired labor	--	--	3,952	18.47	10,144	17.52	26,181	21.67
Total cash costs	5,674	149.32	34,528	161.35	83,378	144.00	138,448	114.61
Other costs:								
Family labor	1,435	37.77	7,642	35.71	11,439	19.76	16,107	13.33
Depreciation	1,662	43.74	6,779	31.68	14,570	25.16	32,149	26.61
Interest on investment other than land	4,382	115.32	22,387	104.61	58,191	100.50	123,021	101.84
Interest on land	14,472	380.83	69,451	324.54	152,903	264.08	333,091	275.74
Total other costs	21,951	577.66	106,259	496.54	237,103	409.50	504,368	417.52
Total all costs	27,625	726.97	140,787	657.88	320,481	553.51	642,816	532.13
Return above cash costs	4,809	126.55	23,964	111.98	79,062	136.55	196,277	162.48
Return above cash costs and family labor	3,374	88.79	16,322	76.27	67,623	116.79	180,170	149.15
Return to total investment	1,712	45.05	9,543	44.59	53,053	91.63	148,021	122.53
Return to land	-2,670	-70.26	-12,844	-60.02	-5,138	-8.87	25,000	20.70

[1] Kerry Gee, U.S. Department of Agriculture, Ranch Budgets for Riley EIS Area, 1982.

[2] Average herd 38 cows, 85% calf crop based on Jan. 1 bred cow inventory with pregnancy test, 7% calf loss birth to weaning, 3% annual cow loss, 20% replacement rate, 19 cows per bull, cattle prices 1978-80 three-year averages, all other costs 1980, pct. forage dependency BLM 14%, Forest Service 3%, deeded range 39%, state land less than 1%, range lease 1%, irrigated pasture 3%, crop residue 10%, hay 29%, real estate valued on an AU basis.

[3] Average herd 214 cows, 85% calf crop base on Jan. 1 bred cow inventory with pregnancy test, 7% calf loss birth to weaning, 20% replacement rate, 3% annual cow loss, 18 cows per bull, cattle and purchased hay prices 1978-80 three-year averages, all other costs 1980, pct. forage dependency BLM 16%, Forest Service 5%, deeded range 24%, state land 3%, range lease 3%, irrigated pasture 6%, crop residue 16%, hay produced 26%, purchased hay less than 1%, real estate valued on an AU basis.

[4] Average herd 579 cows, 85% calf crop based on Jan. 1 bred cow inventory with pregnancy test, 7% calf loss birth to weaning, 20% replacement rate, 3% annual cow loss, 19 cows per bull, cattle and purchased hay prices 1978-80 three-year averages, all other costs 1980, pct. forage dependency BLM 24%, Forest Service 4%, deeded range 24%, state land 1%, range lease 8%, irrigated pasture 7%, crop residue 13%, hay produced 16%, purchased hay 3%, real estate valued on an AU basis.

[5] Average herd 1,208 cows, 85% calf crop based on Jan. 1 bred cow inventory with pregnancy test, 7% calf loss birth to weaning, 20% replacement rate, 3% annual cow loss, 18 cows per bull, cattle and purchased hay prices 1978-80 three-year averages, all other costs 1980, pct. forage dependency BLM 17%, Forest Service 5%, deeded range 55%, state land 1%, private lease 4%, irrigated pasture 3%, crop residue 7%, hay 8%, real estate valued on an AU basis.

Table I-2 Major Elements of Ranch Budgets for Proposed Action and Alternative Actions [1]

	Existing Condition[2]	Proposed Action	Alternative 2	Alternative 3
LESS THAN 100 ANIMALS				
Gross income	$10,483	$11,618	$11,618	$11,618
Total cash costs	5,674	6,027	6,027	6,027
Value of family labor	1,435	1,591	1,591	1,591
Depreciation	1,662	1,707	1,707	1,707
Interest on investment other than land	4,382	4,758	4,758	4,758
Return above cash costs	4,809	5,591	5,591	5,591
100 to 399 ANIMALS				
Gross income	$58,492	$62,047	$62,047	$58,533
Total cash costs	34,528	35,711	35,711	34,548
Value of family labor	7,642	8,107	8,107	7,648
Depreciation	6,779	6,932	6,932	6,781
Interest on investment other than land	22,387	23,575	23,575	22,401
Return above cash costs	23,964	26,336	26,336	23,985
400 to 999 ANIMALS				
Gross income	$162,440	$166,289	$167,442	$150,894
Total cash costs	83,378	84,454	84,777	80,151
Value of family labor	11,439	11,710	11,791	10,626
Depreciation	14,570	14,719	14,764	14,122
Interest on investment other than land	58,191	59,436	59,808	54,457
Return above cash costs	79,062	81,835	82,665	70,743
1,000 OR MORE ANIMALS [3]				
Gross income	$334,725	$359,718	$360,350	$347,192
Total cash costs	138,448	145,684	145,866	142,072
Value of family labor	16,107	17,310	17,341	16,707
Depreciation	32,149	33,200	33,227	32,673
Interest on investment other than land	123,021	131,248	131,456	127,125
Return above cash costs	196,277	214,034	214,484	205,120

[1] Dr. Kerry Gee, U.S. Dept. of Agriculture, Economics and Statistics Service, Linear Program Analysis for Brothers EIS Area, 1982.
[2] No action condition (Alternative 1) considered same as Proposed Action.
[3] Data for the alternative actions in this size class has been adjusted by BLM to compensate for a small understatement of forage changes in data submitted to the Economics and Statistics Service.

GLOSSARY

Acre-foot - The volume of water that will cover 1 acre to a depth of 1 foot.

Active Preference - That portion of the total grazing preference for which grazing use may be authorized.

Active Use - The total number of AUM's authorized for grazing by livestock.

Actual Use - See active use.

Allotment - An area of land where one or more operators graze their livestock. Generally consists of public land but may include parcels of private or state lands. The number of livestock and season of use are stipulated for each allotment. An allotment may consist of one or several pastures.

Allotment Management Plan (AMP) - An intensive livestock grazing management plan dealing with a specific unit of rangeland, based on multiple use resource management objectives. The AMP considers livestock grazing in relation to the renewable resources -- watershed, vegetation and wildlife. An AMP establishes the season of use, the number of livestock to be permitted on the range and the range improvements needed.

Alluvial - Pertaining to material that is transported and deposited by running water.

Animal Unit Month (AUM) - The amount of forage required to sustain the equivalent of one cow with one calf, or their equivalent for one month.

Annual Vegetative Growth - e amount of forage or herbage produced during one growing season.

Archeologic Resources - All physical evidence of past human activity, other than historical documents, which can be used to reconstruct lifeways and cultural history of past peoples. These include sites, artifacts, environmental data and all other relevant information.

Area of Critical Environmental Concern (ACEC) - An area within the public lands where special management attention is required (when such areas are developed or used, or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards (FLPMA Sec. 103(a)).

Browse - That part of leaf and twig growth of shrubs, woody vines and trees available for animal consumption.

Carrying Capacity - The maximum number of animals an area can sustain without inducing damage to vegetation or related resourses, such as watershed.

Characteristic Landscape - The visual characteristics of existing landscape features (including man-made) within a physiographic province. The term does not necessarily mean naturalistic character but rather could refer to landscapes which exhibit both physiographic and land use similarities.

Concentration Area - An area where factors such as terrain, water, vegetation, fences or management practices result in livestock congregation. Generally, these areas are grazed more heavily than surrounding areas.

Contrast Rating - A method of determining the extent of visual impact for an existing or proposed activity that will modify any landscape feature.

Critical Growing Period - The portion of a plant's growing season, generally between flowering and seed dissemination, when carbohydrate reserves are being stored and seeds produced. Grazing after the start of detrimental due to inadequate moisture for supporting further plant growth later in the season.

Crucial Habitat - A relatively small part of an animal's range or habitat which is essential for the animal's existence because it contains special qualities or features (e.g., water holes, winter food and cover, nesting trees, strutting ground, upland meadow).

Cultural Resources - A term that includes resources of paleontologic, archeologic or historic significance which are fragile, limited, and non-renewable portions of the human environment.

Direct Income - Earnings from production of workers in a specified industry. See Indirect Income.

Dissolved Oxygen Saturation - The amount of gaseous oxygen (O) dissolved in a liquid - usually water.

Distance Zones - The area that can be seen as foreground, middleground, background or seldom seen.

Erosion - Detachment and movement of soil or rock fragments by water, wind, ice or gravity.

Exclosure - An area fenced to exclude livestock and wild horses.

Fecal Coliform - A group of bacteria used as an indicator of sanitary quality in water.

Forage Condition - As it is used in this document, forage condition defines the composition of desirable, intermediate and undesirable plant species.

Forage Production - The amount of forage that is produced within a designated period of time on a given area (expressed in AUMs or pounds per acre). This is the proportion of total annual vegetation production which is consumable by livestock on a sustainable basis.

Forb - Any non grasslike herbaceous plant.

Grazing Preference - See Total Preference.

Groundwater - Subsurface water that is in the zone of saturation.

Gully - A channel, usually with steep sides, through which water commonly flows during and immediately after rains or snow melt.

Habitat Diversity - The relative degree or abundance of plant species, communities, habitats or habitat features (e.g. topography, canopy layers) per unit of area.

Headcutting - An erosional process characterized by the progression up-slope of an initial furrow or rill, leading to the formation of a gully.

Herb - A seed-producing plant that does not develop persistent woody tissue.

Herbage - Herbaceous plant growth, especially fleshy, edible plants.

Herbaceous Plants - Plants having little or no woody tissue.

Indirect Income - Earnings or personal income to workers outside a specified industry generated by production in that industry. For example,personal income to those outside the livestock industry generated by the business and personal expenditures of the livestock industry as well as successive rounds of expenditures which may result in the community. Indirect income as defined here includes induced income.

Infiltration - The gradual downward flow of water from the surface through soil to groundwater.

Intermittent Stream - A stream or portion of a stream that flows only in direct response to precipitation. It receives little or no water from springs and no long-continued supply from melting snow or other sources. It is dry for a large part of the year, ordinarily more than 3 months.

Key Species - A plant that is a relatively or potentially abundant species. It should be able to endure moderately close grazing and serve as an indicator of changes occurring in the vegetational complex. The key species is an important vegetative component that, if overused, will have a significant effect on watershed conditions, grazing capacity, or other resource values. More than one key species may be selected on an allotment. For example, a species may be important for watershed protection and a different species may be important for livestock forage or wildlife forage, etc.

Limiting Factor - A component of the environment which regulates animal populations (e.g., food, water, cover).

Litter - A surface layer of loose, organic debris, consisting of freshly fallen or slightly decomposed organic materials.

Livestock Forage Production - see Forage Production.

Management Framework Plan (MFP) - Land use plan for public lands which provides a set of goals, objectives and constraints for a specific planning area to guide the development of detailed plans for the management of each resource.

National Register of Historic Places - Established by the Historic Preservation Act of 1966, the Register is a listing maintained by the National Park Service of architectural, historical, archeologic and cultural sites of local, state or national significance.

Paleontology - A science dealing with the life of past geological periods as known from fossil remains.

Pasture - A fenced subdivision of a grazing allotment capable of being grazed by livestock independently from the rest of the allotment.

Perennial Stream - A stream or portion of a stream that flows year long. It receives water from precipitation, springs, melting snow and/or groundwater.

Permits/Leases - Under Section 3 of the Taylor Grazing Act, a permit is a document authorizing use of the public lands within grazing districts for the purpose of grazing livestock. Under Section 15 of the Taylor and Grazing Act, a lease is a document authorizing livestock grazing use of public lands outside grazing districts.

pH - The negative logarithm of the hydrogen ion concentration. A low pH indicates an acid, and a high pH indicates an alkaline substance. A pH of 7.0 is considered neutral

Planning Area Analysis (PAA) - A planning document which analyzes the relationship of social and economic data to the physical and biological data presented in a Unit Resource Analysis (URA).

Plant Composition - The proportions of various plant species annual production in relation to the total annual production of all plants on a given area.

Plant Maturity - That point in the growing season when an individual plant species has set seed, stored food reserves and gone into the dormant stage. This time is different for various species.

Plant Vigor - See Vigor

Playa - A shallow lake in an arid or semi-arid region in which water evaporates during the drier months to leave a dry lake bed.

Preference - See Total Preference and Active Preference.

Proprietor - One who owns and operates their own business; one engaged in economic activity on their own account and not as an employee. Farm or ranch proprietor need not own the land used.

Public Land - Formal name for lands administered by the Bureau of Land Management.

Range Improvement - A structure, action or practice that increases forage production, improves watershed and range condition or facilitates management of the range or the livestock grazing on it.

Range Trend - A measure of the direction of change in range condition.

Research Natural Areas - Areas established and maintained for research and education. The general public may be excluded or restricted where necessary to protect studies or preserve research natural areas. Lands may have: (1) Typical or unusual faunistic or floristic types, associations, or other biotic phenomena, or (2) Characteristic or outstanding geologic, pedologic or aquatic features or processes.

Residual Ground Cover - That portion of the total vegetative ground cover that remains after the livestock grazing season.

Rest - As used in this statement, refers to deferment of grazing on a range area (pasture) to allow plants to replenish their food reserves.

Riparian - Related to wet areas associated with streams, lakes, reservoirs, ponds, springs, seeps, and wet meadows.

Runoff - That portion of the precipitation on a drainage area that is discharged from the area in stream channels, including both surface and subsurface flow.

State Historic Preservation Office (SHPO) - The official within each State, authorized by the State at the request of the Secretary of the Interior, to act as a liaison for purposes of implementing the National Historic Preservation Act of 1966.

Thermal Cover - Vegetation or topography that prevents radiational heat loss, reduces wind chill during cold weather, and intercepts solar radiation during warm weather.

Total Preference - The total number of animal unit months of livestock grazing on public lands, apportioned and attached to base property owned or controlled by a permittee or lessee. The active preference and suspended preference are combined to make up the total grazing preference.

Unallotted Lands - Public lands which currently have no authorized livestock grazing.

Unit Resource Analysis - A BLM planning document which contains a comprehensive inventory and analysis of the physical resources and an analysis of their potential for development, within a specified geographic area.

Upland - All rangelands other than riparian or playa areas.

Useable Forage Production - The maximum stocking rate that with a particular kind of livestock and grazing system will maintain a static or upward trend in ecosite condition. This incorporates such things as the suitability of the range to grazing as well as the proper use which can be made on the plants within the area. Normally expressed in terms of acres per animal unit month (ac/AUM) or sometimes referred to as the total AUMS that are available in any given area, such as an allotment. Areas that are unsuitable for livestock use are not considered to be part of the useable forage production.

Utilization - The proportion of the current year's forage production that is consumed or destroyed by grazing animals. This may refer either to a single species or to the whole vegetative complex. Utilization is expressed as a percent by weight, height or numbers within reach of the grazing animals. Four levels of utilization are used in this document: light (21-40 percent), moderate (41-60 percent), heavy (61-80 percent), and severe (81-100 percent).

Vegetation Allocation - In reference to forage, the distribution of the available forage production to the various resource needs such as wildlife, livestock, wild horses and nonconsumptive use.

Vegetation Manipulation - As used in this statement, refers to seeding and brush control range improvements.

Vegetation Type - A grouping of plant communities which have similar dominant plant species.

Vegetative Ground Cover - The percent of the land surface covered by all living and undecomposed remnants of vegetation within 20 feet of the ground.

Vigor - The relative well-being and health of a plant as reflected by its ability to manufacture sufficient food for growth, maintenance and reproduction.

Visual Contrast - The effect of a striking difference in the form, line, color or texture of the landscape features in the area being viewed.

Visual Resource - The land, water, vegetation, animals and other features that are visible on all public lands.

Visitor-Day - Twelve visitor-hours, which may be agregated continuously, intermittently or simultaneously by one or more persons. Visitor-days may occur either as recreation visitor-days or as non-recreation visitor-days.

Visual Resource Management (VRM) Classes - The degree of alteration that is acceptable within the characteristic landscape. It is based upon the physical and sociological characteristics of any given homogenous area.

Water Gap - Small areas which allow livestock access to streams.

Water Yield - The amount of water discharged in streams.

Wilderness Study Area - A roadless area or island that has been inventoried and found to have wilderness characteristics as described in Section 603 of the Federal Land Policy and Management Act of 1976 and Section 2(c) of the Wilderness Act of 1964.

Work Year - One person working the full-time equivalent of one year.

References Cited

Adams, G.R.
1980. Results of Range/Wildlife Prescribed Burning on the Fort Rock Ranger District in Central Oregon. Fuels Management Notes, U.S.D.A. For. Serv., Region 6, Portland, Oreg.

Alderfer, R.B. and R.R. Robinson
1974. Runoff from Pastures in Relation to Grazing Intensity and Soil Compaction. Journal of the American Society of Agronomy 39:948-958.

Anderson, E. William and Richard J. Scherzinger
1975. Improving Quality of Winter Forage for Elk by Cattle Grazing. Journal of Range Management 28(2): 120-125.

Bailey, R.W. and O.L. Copeland, Jr.
1961. Low Flow Discharges and Plant Cover Relations on Two Mountain Watersheds in Utah. Utah International Association of Science Hydrology Publication 51:267-278. **In**: Mattison, J.L. and S.C. Buckhouse. Ecological Land Units of Bear Creek Watershed and their Relationship to Water Quality. Water Resources Research Institute, WRRI-53. Oregon State University, Corvallis, Oreg. 1977.

Branson, F.A., G.F. Gifford, and S.R. Owen
1972. Rangeland Hydrology. Society for Range Management, Denver, Colo.

Bright, Ruth McGilvra
1979. Harney Area Cultural Resources Class I Inventory: A Cultural Resources Overview. Bureau of Land Management, Burns, Oreg.

Britton, C.M. and M.H. Ralps
1978. Use of Fire as a Management Tool in Sagebrush Ecosystems. The Sagebrush Ecosystem, a symposium, Utah State University, Logan, Utah.

Cook, C. Wayne
1971. Effects of Season and Intensity of Use on Desert Vegetation. Utah State Experiment Station Bulletin 483. Utah State University, Logan, Utah.

Deacon, James E., Gail Kobetich, James P. Williams, Salvador Contreras and Other Members of the Endangered Species Committee of the American Fisheries Society
1979. Fishes of the North America Endangered, Threatened, or of Special Concern: 1979. Fisheries, Vol. 4, No. 2.

Dealy, J. Edward, Donavin A. Leckenby and Diane M. Concannon
1981. Wildlife Habitats in Managed Rangelands --The Great Basin of Southeastern Oregon. Pacific Northwest Forest and Range Experiment Station, USDA, Forest Service, Portland, Oreg.

Finley, R.R.
1974. Changes in Plant Communities Following Rangeland Brush Control. M.S. Thesis, Oregon State University, Corvallis, Oreg.

Garrison, George A.
1953. Effects of Clipping on Some Range Shrubs. Journal of Range Management 6:309-317. **Cited In** Stoddard, Smith and Box, 1975 (q.v.).

Gee, Kerry
1982. Ranch Budgets and Results of Linear Program Analysis. National Economics Division, Economics Statistics and Cooperative Services, U.S.D.A., Fort Collins, Colo.

Guenther, Keith and Thomas E. Kucera.
1978. Wildlife of the Pacific Northwest: Occurrence and Distribution by Habitat, BLM District and National Forest. USDA Forest Service, Pacific Northwest Region.

Hanson, Clayton L., Armine R. Kuhlman, Carl J. Erickson and James K. Lewis
1972. Range Condition and Runoff in Western South Dakota. South Dakota Farm and Home Research 13:11-13.

Hanson, W. R. and L. A. Stoddard.
1940. Effects of Grazing upon Bunch Wheatgrass. Journal of the American Society of Agronomists 32:278-289.

Harniss, R.O. and R.B. Murray
1973. Thirty Years of Vegetal Change Following Burning of Sagebrush/Grass Range. Journal of Range Management 26:322-325.

Herman, Steven G., John B. Bulger and Joseph B. Buchanan
Undated. The Snowy Plover in Southeastern Oregon and Western Nevada. 21 page mimeograph

Hormay, A.L.
1970. Principles of Rest Rotation Grazing and Multiple-Use Land Management. USDI, Bureau of Land Management and USDA, Forest Service, Berkeley, Calif.

Hyatt, S.W.
1966. Sagebrush Control-Costs, Benefits and Results to the Rancher. Journal of Range Management 19:42-43.

Hyder, Donald N. and W.A. Sawyer
1951. Rotation-Deferred Grazing as Compared to Season Long Grazing on Sagebrush-Bunchgrass Ranges in Oregon. Journal of Range Management 4(1):30-34.

Johnson, Steven R., Howard L. Gray, and Stanley L. Ponce
1978. Range Cattle Impacts on Stream Water Quality in the Colorado Front Range. USDA Forest Service Research Note RM-359. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

Laycock, W.A. and P.W. Conrad
1981. Responses of Vegetation and Cattle to Various Systems of Grazing on Seeded and Native Mountain Rangeland in Eastern Utah. Journal of Range Management 34(1):52-58

Leckenby, Donavin A., D.P. Sheehy, C.A. Nellis, et al.
[1980]. Wildlife Habitats in Managed Rangelands - The Great Basin of Southeast Oregon -- Mule Deer. Unpublished manuscript. (Part of a series sponsored by the BLM and US Forest Service, Pac. Northwest For. and Range Exp. Stn.)

Lindsay, M.G., B.B. Lovell, J.A. Norgren, G.H. Simonson, B.R. Thomas and D.W. Anderson
1969. Oregon's Long-Range Requirements for Water- General Soil Map Report with Irrigable Areas, Malheur Lake Drainage Basin, Appendix I-12. State Water Resources Board, Salem, Oregon.

Lovell, B.B., J.A. Norgren, G.H. Simonson, M.G. Lindsay and D. Anderson
1969. Oregon's Long-Range Requirements for Water- General Soil Map Report with Irrigable Areas, Goose and Summer Lakes Drainage Basin, Appendix I-13. State Water Resources Board, Salem, Oreg.

McLean, A. and E.W. Tisdale
1972. Recovery Rate of Depleted Range Sites under Protection from Grazing. Journal of Range Management 25:178-184

Muegler, W.F. and J.P. Blaisdell
1958. Effects on Associated Species of Burning Rotobeating, Spraying and Railing Sagebrush. Journal of Range Management 11:61-66

Oregon Department of Energy
1980. Oregon's Energy Future: Fourth Annual Report, January 1, 1980. Oregon Dept. of Energy, Salem, Oreg.

Oregon Department of Environmental Quality.
1976a. Proposed Water Quality Management Plan - Goose and Summer Lakes Basin. (consists of 2 volumes: text and appendices).

_____
1976b. Proposed Water Quality Management Plan - Klamath Basin. (consists of 2 volumes: text and appendices).

Oregon Department of Human Resources, Employment Division
1981. Covered Employment and Payrolls, Salem, Oreg.

_____
1982. State/County Resident Labor Force, Unemployment and Employment, 1980. Salem, Oreg.

Oregon Department of Fish and Wildlife
1977. Oregon's Threatened or Endangered Wildlife. Portland, Oreg.

_____
1981a. Proposed Management Objectives and Related Benchmark Data for the Mule Deer Area of Central and Eastern Oregon. Public Review Draft. Portland, Oreg.

_____
1981b. Proposed Management Objectives and Related Benchmark Data for the Mule Deer Area of Northeastern Oregon. Public Review Draft. Portland, Oreg.

Oregon Department of Transportation
1976. Oregon Recreation Demand Bulletin 1975. Technical Document 1 of the Statewide Comprehensive Outdoor Recreation Plan, Parks and Recreation Branch. Salem, Oreg.

_____
1978. Oregon Outdoor Recreation Plan 1978. Review Draft. Photocopy. Salem, Oreg.

Oregon State University, Extension Service, Extension Economic Information Office
1981. Commodity Data Sheets. Oregon State University, Corvallis, Oreg.

Owensby, G.E., E.F. Smith, and K.L. Anderson
1973. Deferred Rotation Grazing with Steers in the Kansas Flint Hills. Journal of Range Management 26:393-395.

Pacific Northwest River Basins Commission
1970. Columbia-North Pacific Region Comprehensive Framework Study of Water and Related lands. Appendix V, Water Resources. Vancouver, Wash.

Polenz, Al
1982. Personal communication between Al Polenz, Regional biologist, Oregon Department of Fish and Wildlife, Hines, Oregon and Fred Taylor, district biologist, BLM, Burns, Oregon

Rauzi, Frank and Clayton L. Hanson
1966. Water Intake and Runoff as Affected by Intensity of Grazing. Journal of Range Management 19:351-356.

Reynolds, Timothy and Charles H. Trost
1978. The Response of Native Vertebrate Populations to Crested Wheatgrass Planting and Grazing by Sheep. Journal of Range Management 33(2): 122-125.

Robbins, Jackie W.D.
1978. Environmental Impact Resulting from Unconfined Animal Production. EPA-60012-78-046. Robert S. Kerr Environmental Research Laboratory, U.S. Environmental Protection Agency, Ada, Okla.

Savage, D.E.
1969. The Relationship of Sage Grouse to Upland Meadows in Nevada. Nevada Cooperative Wildlife Research, Reno, Nev.

Stoddart, L.A., A. D. Smith and T.W. Box
1975. Range Management. McGraw-Hill, New York.

Storm, Robert M.
1966. Endangered Plants and Animals of Oregon II, Amphibians and Reptiles, Special Report 206. Agriculture Experiment Station, Oregon State University, Corvallis, Oreg.

Sturges, David L.
1978. Hydrologic Relations of Sagebrush Lands. The Sagebrush Ecosystem: a Symposium. April 1978, Utah State University.

1979. Wildlife Habitats in Managed Rangelands - The Great Basin of Southeastern Oregon, Riparian Zones. USDA, Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oreg.

Tueller, P. and C. Poulton
1960. Vegetation Changes at Squaw Butte 1937-1960. Unpublished mimeo, Squaw Butte Experiment Station, Burns, Oreg.

Tueller, Paul and Gerald D. Tower
1979. Vegetation Stagnation in Three-Phase Big Game Exclosures. Journal of Range Management 32(4):258-263

U.S. Department of Agriculture, Forest Service
1979. Wildlife Habitats in Managed Forests - The Blue Mountains of Oregon and Washington. J.W. Thomas, ed. U.S.D.A., Ag. Handbk. # 553.

_____
1980. 1977 County Inter-industry Tables. Unpublished materials developed for RARE II studies. Region 6, Portland, Oreg.

U.S. Department of Commerce, Bureau of the Census
1972. Census of Population: 1970. General Social and Economic Characteristics. Final Report PC(1)-C39 Oregon. U.S. Govt. Printing Office, Washington, D.C.

_____
1980a. Preliminary Population Counts - Oregon.

_____
1980 c. 1978 Census of Agriculture, Oregon State and County Data. U.S. Govt. Printing Office, Washington, D.C.

U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Analysis Division
1982. Regional Economic Information System. Washington, D.C.

U.S. Department of Interior, Bureau of Land Management
1978. Vegetation Management with Herbicides: Western Oregon Final Environmental Statement. Prepared by the Oregon State Office, Portland, Oreg.

1979a. Interim Management Policy and Guidelines for Lands Under Wilderness Review. Washington, D.C.

_____
1980a. Wilderness Inventory, Oregon and Washington -- Final Intensive Inventory Decisions. Prepared by the Oregon State Office, Portland, Oreg.

_____
1980b. Areas of Critical Environmental Concern (ACEC's): Policy and Procedures Guidelines. Washington, D.C.

_____
1980c. Owyhee Grazing FEIS. Boise District Office, Boise, Idaho.

_____
1980d. Ironside Grazing DEIS. Oregon State Office, Portland, Oreg.

Urness, Philip J.
1966. Influence of Range Improvement Practices on Composition, Production and Utilization of Artemisia Deer Winter Range in Central Oregon. A dissertation presented to Oregon State University for partial fulfillment of Ph.D requirements. 183 pp.

Van Pollen, H.W. and J.R. Lacey
1979. Herbage Response to Grazing Systems and Stocking Intensities. Journey of Range Management 32(4):250-253

Vavra, Marten and Forrest Sneva
1978. Seasonal Diets of Four Ungulates Grazing the Cold Desert Biome. Presented to the First International Rangeland Congress, August 1978. Available from Eastern Oregon Agricultural Reseach Center; Union, Oregon and Burns, Oreg.

Westoby, M., and F.H. Wagner
1973. Use of a crested wheatgrass seeding by black-tailed jackrabbits. Journal of Range Management 26(5):349-352

Willis, Mitchell J.
1982. Oregon Pronghorn Study Update. Unpublished study. Oregon Department of Fish and Wildlife Regional Office, Hines, Oregon

Winegar, H. H.
1977. Camp Creek Channel Fencing--Plant, Wildlife, Soil, and Water Response. Rangeman's Journal 4(1):10-12.

Winter, J.R. and James K. Whittaker
1979. An Economic Analysis of Land Prices of Mountainous Grazing Land in Eastern Oregon. Special Report 560, Oregon State University Agricultural Experiment Station, Corvallis, Oreg.

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